TC-10022-04

# SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON

Contract No. DACW57-96-D-0009-Task Order 10

Prépared for



U.S. Army Corps of Engineers
Portland District
333 Southwest First Avenue
P.O. Box 2946
Portland OR 97208-2946

December 1998

Prepared by



Tetra Tech
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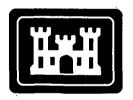
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TETRA TECH

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SECTION 1.0 INTRODUCTION

Pursuant to the requirements of Contract DACW57-96-D-0009, Task Order 10, the U.S. Army Corps

of Engineers Portland District (CENWP) requested that engineering services be provided by Tetra

Tech, Inc. to conduct a site inspection of the abandoned Bradford Island landfill, located at the

Bonneville Lock and Dam Project in Cascade Locks, Hood River County, Oregon. The purpose of the

site inspection was to determine if historical disposal practices at the landfill had adversely impacted the

environment and, if so, to determine if removal or other remedial actions would be necessary, or if

further investigation is required.

Site inspection activities at the Bradford Island landfill site included collection of surface soil, subsoil,

and groundwater samples. Samples collected during the site inspection were obtained from test pits

excavated using a backhoe, and from borings and groundwater monitoring wells installed using hollow

stem auger drilling techniques. An attempt was also made to collect sediment samples from the

Columbia River adjacent to the landfill site. However, no sediment was present in the areas identified

for sample collection during repeated sampling attempts. A visual survey for the presence of

groundwater seeps on the steep shoreline adjacent to the landfill site was also performed during the site

inspection field investigation.

This site inspection report has been prepared to summarize the field activities conducted at the site

during August and September 1998, and to document the results of the associated soil and groundwater

sampling and analytical program. This document includes a comparison of the analytical results

obtained with selected risk-based screening levels, and with the applicable or relevant and appropriate

requirements (ARARs) that have been preliminarily identified for the site.

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SECTION 2.0 PROJECT DESCRIPTION

Bradford Island is part of the Bonneville Lock and Dam Project, within the Columbia River which

forms the border between the states of Oregon and Washington in the project area (Figure 1). The

landfill site is in the northeast corner of Bradford Island and is located within the State of Oregon. The

site is within the southwest quadrant of Section 22, Township 2 North, Range 7 East, Willamette

Meridian; and is not currently used as a part of the routine operation of the Bonneville Lock and Dam.

Based on historical information available regarding disposal activities at the site, four main areas of

concern have been identified (Stampe 1996; see Figure 2). These areas of concern include:

A concrete pad on the southern edge of the landfill site that was used as a pesticide

mixing area and to rinse articles containing pesticides;

A number of trash pits located within the landfill site that are believed to have been filled

with mercury vapor lamps, oil and grease from the dam turbines, grease from the wicket

and spill gates, and paint-related wastes including solvents;

■ The sediments adjacent to the bank of the Columbia River east of the landfill site that was

reportedly used for storage and disposal of 5-gallon buckets of spillway gate grease,

switch gear, and various cables;

The sediments adjacent to the bank of the Columbia River north of the landfill site where

scrap metal including pipes with lead-based paint, pneumatic and hydraulic equipment,

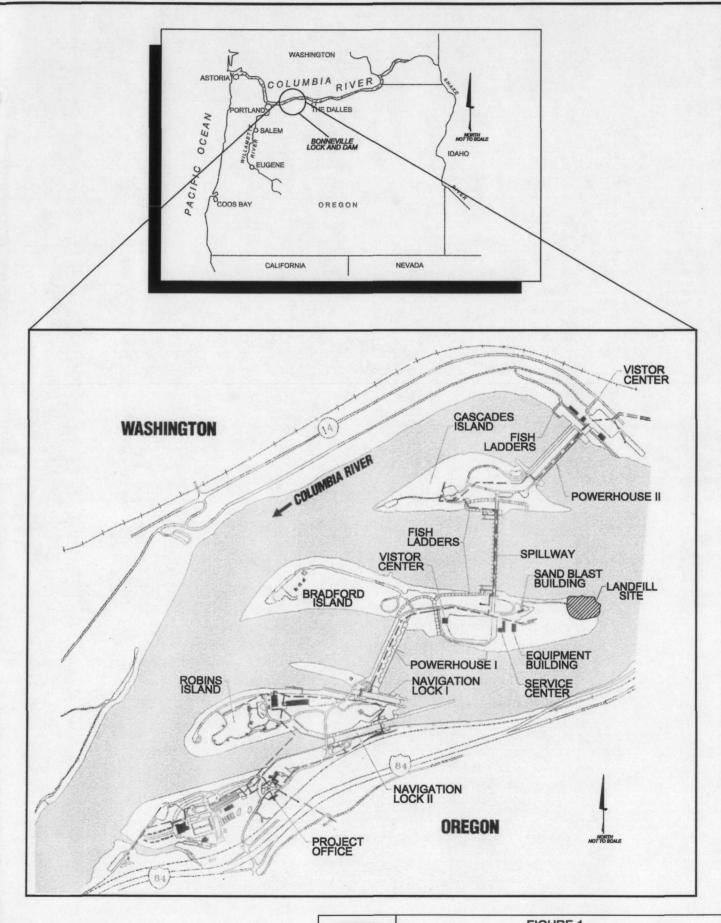
and insulators that possibly held residual polychlorinated biphenyl (PCB) -containing oil

were reportedly disposed.

The following sections summarize the physiography, geology and hydrology, site history, and previous

investigations associated with the landfill site. The discussions regarding site physiography, geology,

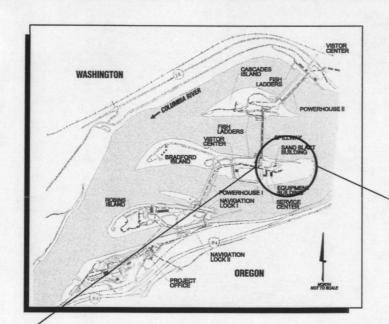
and hydrology have been developed by the CENWP (COE 1998).





#### FIGURE 1

SITE LOCATION MAP. BRADFORD ISLAND LANDFILL SITE, CASCADE LOCKS, OREGON



**LEGEND** 

PESTICIDE MIXING AREA

**DISPOSAL PITS** 

NORTH BANK MIXED WASTE DISPOSAL AREA

EAST BANK MIXED WASTE DISPOSAL AREA

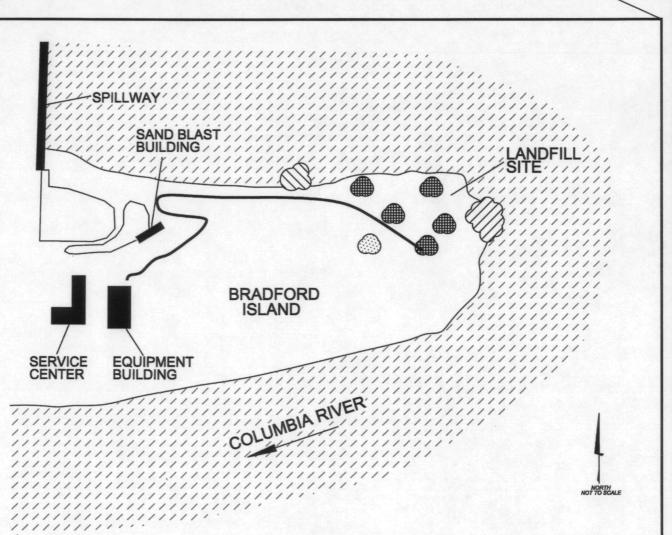




FIGURE 2

SITE PLAN. BRADFORD ISLAND LANDFILL SITE, CASCADE LOCKS, OREGON 2.1 PHYSIOGRAPHY

The former landfill site is located on Bradford Island within the Columbia River. The site is located

near the northeast (upstream) corner of the island and is within 100 feet of the Bonneville Pool

(Figure 3). The ground surface of the landfill site is rather flat at an approximate elevation of 110 feet

above mean sea level (msl), with a slight slope toward Bonneville Pool (minimum elevation 70 feet

msl). Toward the pool on the east and north sides of the landfill site, the ground surface becomes steep

and drops rather abruptly to below pool level. To the south and southwest the ground surface rises

moderately to steeply toward the center of the island. Surface runoff from this area tends to run into

the landfill site.

2.2 GEOLOGY AND HYDROLOGY

Bradford Island consists of a heterogeneous assemblage of alluvial and land slide materials that have

been deposited in a deep bedrock channel within the Columbia River. Bedrock beneath the island is

generally deeper than elevation minus 100 feet msl. Much of the east end of the island, where the

landfill is located, is underlain by a single or several very large slide blocks of Eagle Creek Formation

materials. The slide blocks are part of the Tooth Rock Landslide located adjacent to the area on the

Oregon side of the river.

2.2.1 Bedrock and Significant Rock Units

Bedrock beneath the land fill site consists of stratified volcaniclastic rocks, informally referred to by the

COE as the Weigle formation. In geologic literature, the Weigle formation is considered to be part of

the Ohanapecosh Formation, and more recently part of the Stevens Ridge Formation. The Weigle

formation was originally defined and divided from the Eagle Creek Formation in 1960. Before 1960,

the Weigle formation was included within the Eagle Creek Formation. The Eagle Creek Formation

described by Holdredge (Holdredge 1937), includes both the present day Eagle Creek Formation and

the informal Weigle formation.

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#### Figure 3

U.S. Army Corps of Engineers
Topography and Piezometer Location Map

Bradford Island Landfill Site Cascade Locks, Oregon

### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

1200 SIXTH AVENUE SEATTLE, WA 98101

#### **TARGET SHEET**

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	Figure 3	-

Significant bedrock units within the Bonneville Project area include: 1) the Weigle formation which is

the oldest and stratigraphically the lowest unit exposed in the Columbia River Gorge; 2) the Eagle

Creek Formation which unconformably overlies the Weigle formation; and 3) the Columbia River

Basalt Group which disconformably overlies the Eagle Creek Formation. Only the Weigle formation

makes up the bedrock beneath the site. The other units are significant in forming large slide blocks and

slide debris within the overburden beneath Bradford Island.

2.2.1.1 Weigle Formation. The Weigle formation makes up the bedrock beneath the landfill site. The

Weigle formation also makes up the foundation rock for the spillway dam and second powerhouse and

has been traced across the valley floor in exploratory bore holes. The Weigle formation is late

Oligocene in age and consists of locally derived volcaniclastic materials which have been subaqueously

deposited. Approximately 2/3 of the clastic materials which make up this formation were originally

deposited as fine grained volcanic glass. The remaining 1/3 of the clastic materials were predominantly

larger sized lithic fragments. The lithology of the Weigle formation consists of interbedded mudstones

(that make up the bulk of the formation), siltstones, sandstones, and minor conglomerates.

Stratification within the Weigle formation is extremely varied and discontinuous. Bedding thickness

can range from less than 0.1 inch to greater than 20 feet. Individual beds generally cannot be traced

laterally more than a few hundred feet. Bedding contracts are variable, ranging from sharp and planar

to gradational and indistinct.

The Weigle formation is considerably altered. This alteration is manifested by the devitrification of

volcanic glass. The volcanic glass which originally made up the bulk of the fine grain size fraction of

the rock has been completely altered to a dominantly clay mineral assemblage. The alteration of the

Weigle formation makes it very susceptible to slaking. This alteration has also made the Weigle

formation relatively impermeable. The upper foot of so of the Weigle formation is generally altered to

a high plasticity clayey silt [Unified Soil Classification System (USCS) designation MH] to a low to

medium plasticity clay (USCS designation CL) that tends to form a water tight rind. Moreover, faults

and shear zones within the Weigle formation have generally produced clay gouge zones that render

these discontinuities nearly impermeable.

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The Weigle formation has been significantly disturbed. This disturbance is manifested by folding and

faulting. Bedding strikes generally trend to the northeast and north, and dip from 5 to 20 degrees to

the southeast and east. Faults and shear zones observed in the foundation of the second powerhouse

generally follow two trends: 1) strike to the northwest and dip moderately to steeply to the northeast;

and 2) strike to the northeast and dip gently to moderately to the northwest. Up to 20 feet of

displacement has been noted on the faults. The disturbance noted in the Weigle formation does not

continue into the overlying Eagle Creek Formation implying that the disturbance occurred before the

deposition of the Eagle Creek Formation.

Within landslide deposits, Weigle formation materials can form blocks and slide debris. Weigle slide

debris generally consists of soft to dense plastic matrix material that is impermeable. Lithic clasts from

the Weigle formation or other formations can be included. The basal zone of the Tooth Rock

Landslide consists of an approximately 60-foot thick zone of sheared Weigle formation. This material

is generally dense and impermeable.

2.2.1.2 Eagle Creek Formation. The Eagle Creek Formation unconformably overlies the Weigle

formation, and is exposed on the Columbia River Gorge walls above the river level. The Eagle Creek

Formation is present only on the Gorge walls and not across the valley floor of the Gorge. This rock

unit is significant to the site because large detached blocks and debris of Eagle Creek Formation

materials are present in the landslide deposits that underlie Bradford Island. In 1961 and 1970, the

Eagle Creek Formation was redefined to distinguish it from the underlying Weigle formation. The

Eagle Creek Formation is a series of "volcanic conglomerates, sandstones and tuffs". The major distinctions between this formation and the Weigle are the coarser grain size, and the lack of alteration

and disturbance. Volcanic glass that makes up a significant constituent of the Eagle Creek Formation remains relatively fresh and unaltered. Bedding dips are generally near horizontal, and no significant

faulting or discontinuities are present. Most of the rock types are volcanic conglomerates which

contain angular boulder and cobble-size rock fragments in a matrix-supported groundmass of fine

gravel to coarse sand size pumice and/or scoria. True ortho-conglomerates and sandstones are present

in lesser amounts. Fine-grained rock types which make up the bulk of the Weigle formation are rare in

the Eagle Creek Formation.

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Within landslide deposits Eagle Creek Formation materials form slide blocks and slide debris. Slide

debris of Eagle Creek Formation generally has a granulated non plastic matrix that is somewhat

permeable. Slide debris zones between slide blocks can be connected hydraulically to adjacent

aquifers. Water levels within these zones will generally be higher that that of the adjacent aquifers

implying limited permeability along these features.

2.2.1.3 Columbia River Basalt Group. The Columbia River Basalt Group disconformably overlies the

Eagle Creek Formation. The Columbia River Basalts form the prominent cliffs within the Columbia

River Gorge. This unit makes up bedrock only on the Gorge walls and not across the valley floor.

However, large slide blocks and debris from this unit are present within the landslide deposits that

underlie the landfill site. The Columbia River Basalts generally make up flat-lying beds that show no

disturbance or alteration. The Columbia River Basalts consist of mostly fine-grained, dense rocks.

These rocks are cut by numerous primary cooling discontinuities that range from columnar jointing to

brickbat jointing.

Within landslide deposits, the Columbia River Basalt can form blocks and slide debris. Slide debris

generally consists of angular rock fragments of cobble and larger sizes with voids between. This

material can be highly permeable.

2.2.2 Overburden

The overburden assemblage beneath Bradford Island is a heterogeneous assemblage of two major

landslide deposits; river alluvium and mixtures of river alluvium and slide materials. This assemblage

varies along the length of the island. The upstream end of the island where the landfill is located is

dominated by large landslide block(s) from the Tooth Rock Landslide. This landslide forms the oldest

surficial (overburden) deposits at the site, and are the most significant unit at the site. Following the

Tooth Rock Landslide, alluvial materials have been deposited around the block(s) particularly in the

downstream direction beneath the bulk of Bradford Island. These deposits are in turn covered by

another landslide, the Bonneville Landslide that occurred between 400 and 800 years ago. This

landslide deposit is in turn buried beneath additional alluvial materials.

2.2.2.1 Tooth Rock Landslide. At the upstream end of the island, in the vicinity of the landfill site,

the island is dominated by large Eagle Creek slide block(s). These blocks are part of the Tooth Rock

Landslide that originated from the Oregon side of the Columbia River Gorge. Exploratory data

collected over the last 60 years at the site indicates that these blocks and the incorporating Tooth Rock

Landslide directly overlie bedrock in this area. The Tooth Rock Landslide occurred during the last

great ice age when sea level was as much as 450 feet lower than its present level, and the Columbia

River valley floor as much as 200 feet deeper than its present elevation. Great floods occurred at this

time that stripped most of the surficial deposits from the walls and floor of the Gorge. These floods

and the removal of buttressing surficial materials from the Gorge walls were instrumental in the failure

of the Tooth Rock Landslide.

The Tooth Rock Landslide is a large rotated rock block failure in which the failed rock units were more

or less passively transported on a thick failure arc of granulated Weigle formation that cut deep into the

Weigle formation. Movement on this landslide was restricted by several igneous intrusions at the toe of

the slide. These intrusions allowed the landslide to rotate but prevented the rotational movement from

transitioning to lateral movement. The original rock units have been displaced both vertically and

horizontally by rotation, but except for the basal shear zone of granulated Weigle formation materials,

the materials within the slide generally remain rock-like.

2.2.2.2 Post Ice Age Alluvium. Downstream of the exposed Eagle Creek slide blocks and overlying

the bedrock-rock block contacts, alluvial materials are present that represent the aggradation of the

Columbia River Channel following the end of the ice age. The alluvial materials near the bedrock

surface generally contain a relatively high percentage of materials eroded from the landslide deposit.

The percentage of slide materials generally decreases upwards. The alluvial materials are generally

open and very permeable sand and gravels and form an aquifer beneath all but the upstream part of

Bradford Island.

This unit does not extend upstream beneath the land fill site. However, this unit is in direct contact

with the large Eagle Creek slide block that underlie the site. Slide debris zones between blocks are

considered to be hydraulically connected to this unit which influences the water level encountered in

the debris zones.

2.2.2.3 Bonneville Landslide. Approximately 400 to 800 years ago, a large run out landslide

occurred on the Washington side of the Gorge adjacent to the present day Bonneville Lock and Dam

Project. This landslide, known as the Bonneville Landslide, flowed across the Columbia River valley

floor and against the Oregon side and formed a temporary debris dam that impounded the Columbia

River. A relatively thin layer of slide debris from this landslide covered the project area and formed an

impermeable layer over the pre-landslide alluvial materials. This unit has been partly eroded from the

Bradford Island site. It is not present at the landfill site.

Shortly following the landslide, the river breached the debris dam. It is unknown how high the

impounded waters rose before the breach occurred. The COE estimates the lake elevation could have

been as high as elevation plus 180 feet msl. It is expected that the resulting flood swept over and

around the Tooth Rock Landslide blocks removing any traces of the Bonneville Landslide deposit and

partly eroding the blocks. The flood also eroded materials from the debris dam, and transported and

redeposited the materials downstream in the Bonneville area and up to 4 miles downstream forming a

large deltaic fan deposit that originally spanned the entire valley floor. Particle sizes are expected to

vary with distance from the debris dam. Near the site of the debris dam (i.e., upstream of the

Bonneville Lock and Dam Project) the largest blocks are expected to have dropped out as the energy

level of the flood progressively decreased. Rock blocks to 20 feet in dimension have been encountered

in this unit at distances of up to 2 miles below Bonneville Dam. The lower parts of this unit contained

the greatest amounts of slide debris and are relatively impermeable. The upper part of this unit grades

into more typical alluvial deposits and the terraced surfaces in the area.

The original pre-landslide channel existed to the north of the present day Bonneville Lock and Dam

Project area. The breach occurred to the south near the Oregon side of the Gorge, and permanently

changed the course of the river in this area. During and following the deposition of the deltaic deposit

the river eroded numerous channels through the deposit, and dissected the delta into the numerous

terraces and islands that exist today. The main channel of the Columbia River prior to the construction

of Bonneville Dam ran adjacent to the north side of Bradford Island, adjacent to the present site of the

landfill.

2.2.3 Hydrologic Model

The hydrologic model for the site consists of generally impermeable Eagle Creek slide block material

that underlies the landfill site. Up to 20 feet of surficial, relatively permeable materials overlie the

slide block material. Water at the site is expected to percolate downward through the surficial

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materials to the top of the impermeable slide block where it forms a perched water table. This water is

expected to follow the surface of the slide block seeking the lowest point. This could follow one of two

scenarios: 1) the water seeps along the top of the northward sloping block to pool; and/or 2) the water

seeps into local cracks or debris zones within the block that are connected to the confined aquifer

beneath Bradford Island.

Based on prior drilling and subsurface explorations at the site, the confined aquifer consists of the

alluvial materials that were deposited between the two landslide events. This material has been found

to be highly permeable. A study of this aquifer was performed as part of the New Navigation Lock

work. It is presented in presented in the memorandum entitled Design Memorandum No. 3,

Supplement 1, Bonneville Navigation Lock, Columbia River, Oregon/Washington, Geology, Excavation

and Foundation Design, dated January 1988. Piezometric levels within the unit generally reflect

tailwater levels rather than pool levels suggesting the open nature of this unit. Inflow from the

Bonneville pool is greatly restricted by siltation along the upstream face of Bradford Island. Hydro-

logic conditions encountered onsite during site inspection field activities are described in Section 4.1

Site Hydrogeology.

2.3 SITE HISTORY

This section provides a brief summary of the Bonneville Lock and Dam Project and Bradford Island

landfill site history. The information in this section was provided by the CENWP in the document

entitled Detailed Statement of Work for Contract No. DACW57-96-D-0009, Tetra Tech Task Order

No. 10, Bradford Island Landfill, Bonneville Lock and Dam Project, Cascade Locks, Oregon, Site

Inspection, prepared by the Department of the Army, Portland District Corps of Engineers and dated

17 June 1998.

The Bonneville Lock and Dam Project is a multiple-purpose hydroelectric dam spanning the Columbia

River 40 miles east of Portland, Oregon, at River Mile 146. Construction of the first powerhouse and

navigation lock, spillway, fish passage facilities, fish hatchery, and office and maintenance buildings at

Bonneville Lock and Dam began in 1933. Although construction of the dam was not completed until

the early 1940s, the dam was dedicated by Franklin D. Roosevelt on 28 September 1937. During

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON World War II, the military installed anti-aircraft batteries and a rifle range near the present day location

of the Service Center (see Figure 2). Between 1974 and 1981, a second powerhouse was constructed

on the Washington shore to aid in supplying the electrical power needs of the Northwest. A second

navigation lock was constructed between 1989 and 1993 during which time the southeastern edge of

Bradford Island was excavated for the approach channel. The eastern portion of Bradford Island is

currently managed as wildlife habitat.

In 1993, a Corps of Engineers (COE) internal review of the Bonneville Lock and Dam site and

operations was performed for compliance with environmental regulations under the Environmental

Review Guide for Operations (ERGO) program. As a result of the review, the Bradford Island landfill

was identified as a potential source of environmental impairment based on past waste management and

disposal practices.

As a result of the 1993 COE internal review of the site and operations, personal interviews were

conducted by CENWP personnel of five Project employees familiar with past waste disposal practices

at the landfill site. A summary of these interviews is presented in Appendix A. The results of the

personal interviews concluded the following:

• Pesticide mixing and rinsing occurred near an existing pipe outfall near the landfill;

■ Grease buckets, switch gears, and cables were disposed of in the Columbia River

immediately adjacent to the landfill; and

Household trash, mercury vapor lamps, turbine oil and grease, and paint-related wastes

were deposited in the landfill itself.

Based on the interviews, it was believed that dumping and material disposal had occurred on the

northeast section of Bradford Island for a period of approximately 40 years and ceased in the early

1980s. In addition, as individual waste pits were filled, other waste pits were excavated within the

landfill area for disposal purposes. At this time it is unknown how long disposal occurred at each of

these disposal locations.

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON DACW57-96-D0009/TASK ORDER 0010 As a result of the ERGO findings and the employee interviews, the CENWP submitted a letter dated

13 June 1996 to the U.S. Environmental Protection Agency (EPA) Region 10 and the Oregon

Department of Environmental Quality (DEQ) informing them of the presence of the Bradford Island

landfill. In response to the letter, the EPA requested that sediment samples be collected around the

landfill perimeter and that groundwater seep samples be collected in areas emanating from the side

slopes of the landfill, if seeps were determined to be present.

On 24 February 1997, the CENWP performed a review of available historical aerial photographs of the

landfill site between the years 1936 and 1982. A summary of this aerial photograph review is

presented in Appendix A. Information derived from the aerial photograph review indicated that use of

the landfill began around 1942. By 1952, the landfill appeared to be in its heaviest use. Observations

indicate that deposition of trash occurred off and on until the early 1980s. Some of the materials and

equipment identified as being stored in the landfill area included drums, above ground storage tanks,

vehicles, lumber, and scrap metal. In addition, areas of stained soils were observed at different times

on various parts of the landfill. Soil staining was primarily observed in areas where drums were

stored, and in a central area which may have been a burn pile. By 1982, it appeared that the landfill

had been covered with soil. Information regarding the overall aerial extent of the landfill, estimated

depth of landfilled materials, or the volume of materials disposed within the landfill could not be

obtained from the aerial photograph review.

The Bradford Island landfill was added to the DEQ Environmental Cleanup Site Information (ECSI)

database on 1 April 1997. On 24 April 1997, the Bonneville Lock and Dam Project signed a Letter of

Intent to participate in DEQ's Voluntary Cleanup Program (VCP) for the investigation and remediation

of the landfill site. On 6 November 1997, the Bonneville Lock and Dam Project Manager signed a

DEQ Voluntary Cleanup Agreement letter for the landfill site.

2.4 PREVIOUS INVESTIGATIONS

Only limited environmental investigation of the Bradford Island landfill site has been performed prior to

the site inspection effort, including completion of several soil borings. These borings were drilled to

provide geotechnical and geological information for construction activities at the Project. Piezometers

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON were installed in a number of these borings. The boring and piezometer construction logs associated with three of these borings were available for review and are presented in Appendix B. The locations of these three borings are shown on Figure 3. One of these three borings, DH 2002Z, was drilled through the landfill to a total depth of 115 feet below land surface (BLS) in 1976. The boring, with a surveyed surface elevation of 114.6 feet above msl, reportedly penetrated 12 feet of silty sand fill described as "oily", followed by 15 feet of intermixed fill and slide debris, followed by 88 feet of slide debris consisting primarily of sandstone, siltstone, and conglomerate. Currently, boring DH 2002Z cannot be found and is presumed to be buried within the landfill.

Two additional boring logs, D 2001Z and DH 2005Z, document conditions encountered while drilling at locations to the south (DH 2005Z) and southwest (D 2001Z) of the landfill site. Surficial lithologies described at these locations varied as a result of variations in ground surface elevations with surveyed surface elevations of 95.3 feet above msl in boring D2001Z and 140.6 feet above msl in boring DH 2005Z. Although similar geologic conditions were noted in boring DH 2005Z, unconsolidated materials were noted to a depth of approximately 72 feet BLS in boring D 2001Z.

The Bonneville Lock and Dam Project Environmental Compliance Coordinator (ECC) has inspected the piezometers constructed within these two borings and has measured the depths to groundwater in these piezometers over the period from May 1998 through September 1998. The calculated groundwater elevations associated with these groundwater measurements are presented in Table 1 below.

TABLE 1. GROUNDWATER ELEVATIONS IN FEET ABOVE MSL ASSOCIATED WITH THE U.S. ARMY CORPS OF ENGINEERS PIEZOMETERS								
SITE INSPECTION, BRADFORD ISLAND LANDFILL								
CASCADE LOCKS, OREGON								
Date		Forebay Pool						
Measured	D 2001Z (NE)	D 2001Z (SW)	DH 2005Z	Elevations				
5/21/98	27.45	49.35	119.95	Not Supplied				
5/26/98	26.60	49.70	120.5	74.4				
6/2/98	-		120.5	73.1				
6/22/98	-	-	119.17	73.8				
6/30/98	-	-	118.09	74.0				
7/6/98	-	_	117.27	73.7				
8/6/98	<u>-</u>	-	118.5	74.1				
8/18/98	19.70	50.03	111.4	73.3				
9/3/98	21.00	53.70	112.5	75.8				
9/9/98	21.80	52.86	112.14	75. <u>7</u>				
9/15/98	20.90	54.10	111.9	75.4				

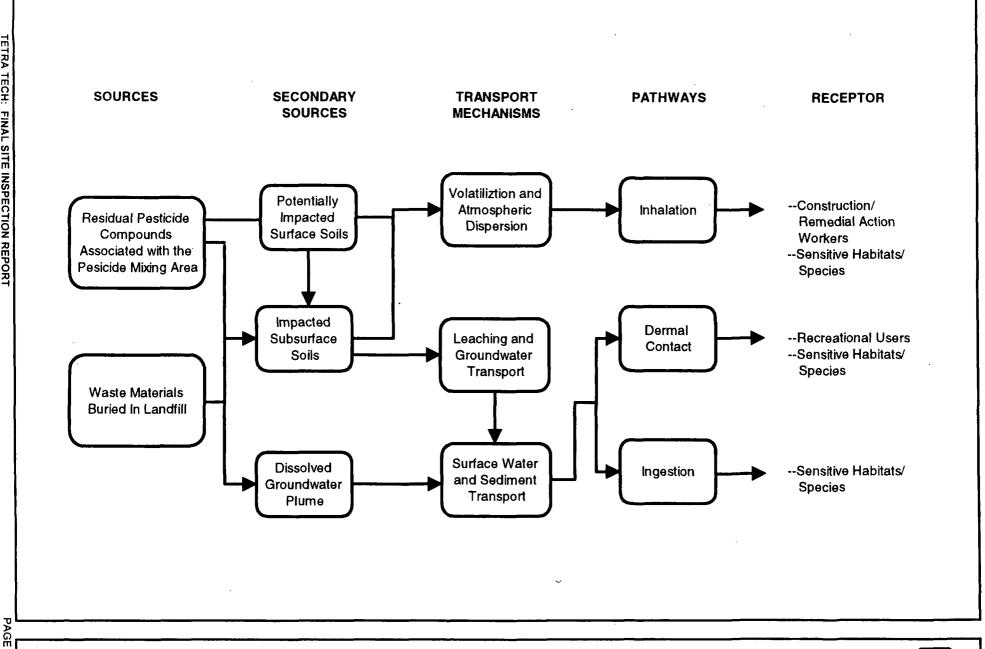
Review of the piezometer construction log associated with boring D 2001Z indicates that one piezometer was constructed within this boring. The bottom of this piezometer is reported to be at an elevation of 24.3 feet above msl, and the top of the piezometer is reported to be at an elevation of 95.3 feet above msl. However, physical inspection of this piezometer location indicated that two piezometers are present within the boring. The Project ECC measured the total depths of each of these piezometers. The bottom elevation of the northeast piezometer was measured at approximately 124 to 125 feet BLS, or 28.7 to 29.7 feet below msl as calculated from the top of casing elevation listed on the associated boring and well construction log. In addition, the bottom elevation of the southwest piezometer was measure to be approximately 49.2 feet BLS, or 46.1 feet above msl using the same calculation. Neither of these elevations match the bottom elevation of the well depicted on the associated boring and well construction log. Therefore, interpretation of the groundwater data obtained from these piezometers is not possible. Review of the piezometer construction logs associated with the remaining two borings indicates that the elevation of the top of the piezometer in DH 2002Z is at 114.65 feet above MSL and that the elevation at the top of piezometer DH 2005Z is at 140.6 feet above msl. The screened intervals are located at elevations of between 63.65 and 56.65 feet above msl in DH 2002Z, and between 10.6 and 16.6 feet above msl in DH 2005Z. However, the filter packed intervals within these two borings are reported to be between 1.35 feet below msl and 103.65 feet above msl in DH 2002Z and between 10.6 and 117.6 feet above msl in DH 2005Z.

In addition, as described in the referenced Detailed Statement of Work, on 9 October 1996 the Project ECC performed an inspection of the northern and eastern edges of the island during a period of low water. During the inspection, the Project ECC observed that there were no wet areas or evidence of seepage on the shore or on the side slopes of the island. In addition, no sheens were detected in the Columbia River at the time of the inspection. Other observations noted by the Project ECC included the presence of solid waste, including tables and cables, in the river near both the northern and eastern edges of the island.

#### 2.5 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) developed for the Bradford Island landfill site (Figure 4) was constructed based on the results of previous site investigations, background interviews, and personal communications with Bonneville Lock and Dam personnel. Because background information available prior to the site inspection indicated the potential for contaminant concentrations to be present in both subsurface soils and groundwater, the CSM assumes that subsurface soil and groundwater quality have been impacted by the waste materials present within the landfill. The CSM also considers that there is a potential for the contaminants present within shallow groundwater beneath the landfill to migrate to the Columbia River immediately adjacent to the site. Given that no groundwater supply wells are present on Bradford Island, the CSM does not consider groundwater ingestion as an active pathway at the site.

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## SECTION 3.0 SCOPE AND TECHNICAL APPROACH

The following sections outline the primary objectives and scope of the site inspection performed at the Bradford Island landfill in August and September 1998. This section also provides an overview of the sampling methodologies that were implemented, and describes the management and disposal of investigation derived wastes. Further information concerning the scope and technical approach, including rationale, was presented in the final site-specific management plans (Tetra Tech 1998a,b).

#### 3.1 OBJECTIVES

The overall sampling objective of the site inspection was to determine if disposal practices in the vicinity of the landfill have adversely impacted the environment and, if so, to determine if remedial actions are necessary or if additional investigation is warranted. The site inspection was designed to provide the CENWP with sediment, soil, and groundwater quality information beneath and adjacent to the landfill, including the four identified areas of concern. The information derived from this effort was to be of sufficient quality and quantity to support comparisons to health and ecological risk-based screening criteria, and to relevant state standards and guidelines for sediment, soil, surface water, and groundwater quality. To meet these objectives, sample locations were selected to maximize the probability of detecting a release of contaminants to the environment with respect to both lateral and vertical placement. The Bradford Island landfill site inspection analytical program was established based on the following:

- Available background information from previous environmental investigations;
- Review of background environmental and hydrogeologic information;
- CENWP review of available historic aerial photographs of the former landfill site; and
- Discussions with personnel knowledgeable regarding past material use and waste handling practices.

Although a number of the compounds that may be present at the landfill site are dense, non-aqueous

phase liquids (DNAPLs) (e.g., trichloroethylene), collection of samples from deeper horizons within

the aquifer was not specified for the following reasons:

The underlying slide block was anticipated to impede downward migration and provide a

target sampling depth at which DNAPLs would be expected to accumulate. Therefore,

soil samples collected during drilling were to be collected at the interface of the slide

block and the overburden.

The purpose of the site inspection was to evaluate whether or not potential discharges

from the four areas of concern had adversely impacted sediment, soil, or groundwater

quality at the site. DNAPLs are generally hydrophobic (i.e., do not readily dissolve in

water) and if they have been discharged to surface or shallow subsurface soils onsite

remnants of their presence would be detected at the proposed sampling intervals.

3.2 INVESTIGATION ACTIVITIES

The Bradford Island landfill site inspection field activities were conducted in two phases. The first

phase of fieldwork was conducted from August 17 through August 20, 1998, and included the

collection of surface soil and subsoil samples, installation of four groundwater monitoring wells, and a

survey of all sampling locations. The second phase of fieldwork, conducted September 1 and 2, 1998,

included the collection of groundwater samples, as well as an attempt to collect sediment samples and

conduct a visual survey of the island for the presence of groundwater seeps. The analytical results

obtained from the samples collected have been used to determine the environmental status of these

media in and adjacent to the four areas of concern which have been identified at the site. The following

section describes the field investigation activities that were performed to meet the overall sampling

objectives of the site inspection. The locations of the samples collected during the site inspection are

presented on Figure 5. A photographic log of site activities is presented in Appendix C.

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON

#### Figure 5

U.S. Army Corps of Engineers Sample Location Map

Bradford Island Landfill Site Cascade Locks, Oregon

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The following field investigation activities were conducted to meet the overall sampling objectives of

the site inspection:

A groundwater seep survey was performed to determine if rainwater that infiltrates the

fill materials in the vicinity of the landfill migrates horizontally along the fill-slide block

interface and enters the Columbia River via groundwater seeps.

A total of eight test pits were excavated in and around the landfill to define the western

boundary of the landfill and the locations of the disposal pits identified in interviews with

Project personnel. A total of eight soil samples and three samples of building materials

thought to potentially contain asbestos were collected from these test pits to determine if

past disposal practices had adversely impacted the environment and/or could pose a threat

to human health.

Three shallow subsurface soil samples were collected to determine background metals

concentrations on Bradford Island.

Four groundwater monitoring wells were drilled and installed around the perimeter of the

landfill using hollow-stem auger drilling techniques.

Where subsurface conditions allowed, split spoon soil samples were collected at 5-foot

intervals during drilling to facilitate lithologic logging at each drilling location. Due to

poor sample recovery, only one subsoil sample was collected for laboratory analysis from

the borings drilled onsite.

One surface soil sample was collected for analysis downgradient of the pesticide mixing

area to determine if residual pesticides had adversely impacted the environment and/or

could pose a threat to human health.

Each of the monitoring wells that yielded groundwater were developed, and one

groundwater sample was collected for analysis from each well to determine if disposal

practices had adversely impacted the shallow groundwater beneath the site.

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■ An attempt was made to collect four sediment samples from the Columbia River adjacent

to the former landfill site. However, multiple sampling attempts from areas adjacent to

the Bradford Island shore to areas nearing mid-channel at each of the identified areas of

concern (i.e., the area north of the former landfill site and the area east of the former

landfill site) were unsuccessful.

■ The surface soil, subsoil, and groundwater samples collected during the site inspection

were submitted to North Creek Analytical laboratory in Bothell, Washington for analysis,

as outlined in Section 3.3.1 below.

Project quality assurance (QA) split samples were delivered to the COE Chemical Quality

Assurance Branch Laboratory in Omaha, Nebraska for analysis as specified in

Section 3.3.1 below.

The elevation and horizontal coordinates of each sample location and each monitoring

well location were surveyed by an independent surveyor licensed in the State of Oregon.

Elevations were surveyed relative to the National Geodetic Vertical Datum (NGVD)

established in 1929, and horizontal coordinates were surveyed relative to the National

American Datum (NAD) Oregon North established in 1927. The survey results are

presented in Appendix D.

3.3 SAMPLE ANALYTICAL PROGRAM

Table 2 presents a summary of the environmental samples collected during the Bradford Island landfill

site inspection field activities, and the analyses performed on each sample. As indicated, the specific

analyses that were performed on samples from each area of investigation were selected based on past

waste disposal activities conducted in each area as reported by Project personnel. The following

sections outline the analytical methods employed during the site inspection and the quality assurance

sampling performed.

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON

## Table 2. Sample Analytical Summary. Site Inspection, Bradford Island Landfill Cascade Locks, Oregon August/September 1998

	August/September 1998																
			S	Primary Contract Laboratory COE QA Laboratory						Laboratory Analyses							
Areas of Investigation	Sample Source	Sample Media	Depth of Sample Collection (feet BLS)	Sample Number <sup>a</sup>	QC Sample Number	Associated Trip Blank	Sample Number	Associated Trip Blank	EPA Methods <sup>b</sup> 8260B, 8270C, 8081A/ 8082, 8151A	HCID YOH by	Methods NWTPH-°	Gx	Cyanide By EPA Method 9010	TAL Metals by EPA 6000/ 7000 Series Methods <sup>d</sup>	TAL Metals by EPA 6000/ 7000 Series Methods with SPLP by EPA Method	PLM by EPA Method 600/R- 93/116 <sup>8</sup>	
Pesticide Mixing Area	Monitoring Well	Water	20-30 <sup>h</sup>	MW2-GW-01		TBOI		TB01	X	Х	X	X	Х	X			
Pestic Mixir Area	Surface Sample	Soil	1	PW1-SS-01					Х	Х	Х	Х			Х		
	Borings	Soil	20	SB1-SS-01					X	Х	X	X			X		
	Monitoring Wells	Water	11-21 <sup>h</sup>	MW3-GW-01		TB01		TB01	X	X	X	X	X	X			
1			10-30 <sup>h</sup>	MW4-GW-01	MW5-GW-01	TB01	MW4-GW-01	TB01	Х	Х	Х	X	X	X			
	Test Pits	Soil	10	TP1-SS-01					X	X	Х	Х		Х			
1			2	TP2-SS-01					Х	X	X	х			X		
<b>!</b>			3.7	TP4-SS-01					Х	X	X	Х		Х			
i l			5	TP5-SS-01	TP9-SS-01		TP5-SS-01		X	X	Х	Х		X			
1			4	TP6-SS-01					X	X	X	X		X			
Œ			6.5	TP6-SS-02					X	_ X	X	X			X		
Former Landfill			4.5	TP7-SS-01					X	X	X	X			X		
1 1				4	TP8-SS-01					Х	X	X	X		X		
ig		Potential	N/A	ASB-01				<u> </u>	<b>!</b>							X	
,5 1		ACMs <sup>8</sup>		ASB-02		<u> </u>	<b>]</b>	<u> </u>								<u>X</u>	
				ASB-03				ļ	<b> </b>			<u> </u>				X	
둳		Soil	0.5	BK1-SS-01	}		Ĭ	1						X		1	
Background			0.5	BK2-SS-01										х	Х		
Back			0.5	BK3-SS-01										Х	Х		

- a All sample numbers begin with the date of sample collection and the site designation for Bradford Island Landfill (e.g. 081098-BIL).
- b Volatile organic compounds by EPA Method 8260B, semi-volatile organic compounds by EPA Method 8270C, pesticides and polychlorinated biphenyls by EPA Methods 8081A/8082, and chlorinated herbicides by EPA Method 8151A.
- c Total Petroleum Hydrocarbon (TPH) Identification by Northwest Method NWTPH-HCID followed, if detected, by diesel through heavy oil range TPH (C11-C36) by Northwest Method NWTPH-Dx, and/or gasoline range TPH (benzene-C10) by Northwest Method NWTPH-Gx.
- d EPA Target Analyte List metals including; aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc by EPA Series 6000/7000 Methods.
- e Synthetic precipitate leaching procedure extraction by EPA Method 1312 followed by Target Analyte List metals by EPA Series 6000/7000 Methods.
- f Asbestos analysis using polarized light microscopy by EPA Method 600/R-93/116.
- g Asbestos containing materials, primarily building materials.
- h Screened interval of monitoring well.

3.3.1 Analytical Methods

The following is a summary of the analytical methods performed on samples collected during the site

inspection field activities:

EPA Method 8260B - volatile organic compounds (VOCs) by gas chromatography/mass

spectrometry (GC/MS) (EPA 1996).

EPA Method 8270C - semi-volatile organic compounds (SVOCs) by GC/MS (EPA 1996).

EPA Method 8081A/8082 - organochlorine pesticides and polychlorinated biphenyls

(PCBs) by gas chromatography/electron capture detection (GC/ECD) (EPA 1996).

EPA Method 8151A - chlorinated herbicides by GC (EPA 1996).

Northwest Total Petroleum Hydrocarbons (TPH): petroleum hydrocarbon identification

(NWTPH-HCID); Range/Extended Diesel (NWTPH-Dx), Gasoline

(NWTPH-Gx) TPH analysis, by gas chromatography/flame ionization detector (GC/FID)

(DEQ 1996).

EPA 6000 and 7000 Series Methods - Target analyte list (TAL) metals by inductively

coupled plasma and mass spectroscopy and mercury by cold vapor atomic absorption

spectroscopy (EPA 1996).

EPA Method 9010B - Total and amenable cyanide by distillation (EPA 1996)

EPA Method Synthetic Precipitate Leaching Procedure Metals - Synthetic precipitate

leaching procedure (SPLP) by Extraction Method 1312 and leachate analysis by appropriate

EPA 6000 or 7000 series method (EPA 1996).

EPA Methods 600/R-93/116 - Asbestos detection by polarized light microscopy.

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3.3.2 Field Quality Assurance/Quality Control Sampling

Quality assurance/quality control (QA/QC) samples were collected during field sampling activities to

evaluate sample reproducibility, the efficiency of field sampling procedures, and the potential for cross-

contamination to have influenced the analytical results. A total of two QC samples were collected.

These QC samples included one duplicate soil sample and one groundwater sample. The duplicate

samples were delivered to North Creek Analytical Laboratory for analysis with unique sample

identification numbers to avoid identification as field duplicate samples.

The field QC samples were collected in triplicate. One of each of these split samples was delivered to

the COE, Missouri River Division Laboratory for analysis to allow comparison with the duplicate

sample results from North Creek Analytical laboratory. The two remaining splits of each of these field

QC samples were submitted to North Creek Analytical, with one split submitted under a unique sample

number identified in project field documentation only as a blind duplicate.

3.4 INVESTIGATION AND SAMPLING METHODOLOGIES

The following sections present the investigation and sampling methodologies used by field personnel

during the site inspection of the Bradford Island landfill site. The methodologies described below

include the procedures used in the sediment sampling attempts; groundwater seep surveying; and soil,

groundwater, and quality control sample collection techniques.

3.4.1 Sediment Sampling

Multiple attempts were made to collect two sediment samples from the Columbia River adjacent to both

the north and east sides of the landfill site. Sample collection from the top 10 cm of sediments was

attempted in each area from just off the shore of Bradford Island to approximately mid-channel of the

Columbia River. A 0.1 square meter van Veen surface grab sampler was used in all sediment sample

collection attempts. The van Veen grab sampler was lowered to the river bottom using the winch and

davit. The sampling attempt was evaluated for sample collection using the following criteria:

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON DACW57-96-D0009/TASK ORDER 0010 Sediments, or fine grained materials, were present within the sampler and the sampler

was not over-filled to the point that those sediments were pressing against the top of the

sampler.

Overlying water was present.

Overlying water was not excessively turbid.

The sediment surface was relatively flat.

The desired penetration depth of 10 cm had been achieved.

The van Veen grab sampler was decontaminated between collection attempts as described in

Section 3.5, Equipment Decontamination.

3.4.2 Groundwater Seep Surveying

A groundwater seep survey was performed to determine if precipitation that infiltrates the fill materials

in the vicinity of the landfill site migrates horizontally along the fill-slide block interface and enters the

Columbia River via groundwater seeps. This survey was performed on 2 September 1998 from a boat

using binoculars due to the nature of the high, steep sloped banks of the island. The sloped banks of

Bradford Island, from the change in slope near the locked gate on the north to the southeastern corner

of the island, were carefully examined for any signs of seepage. While the entire vertical slope was

surveyed, particular attention was given to the horizon estimated to correspond with the fill-slide block

interface.

3.4.3 Soil Sample Collection

The following sections detail the soil sampling methodology used by field personnel during the site

inspection performed at the former Bradford Island landfill site. These methodologies were designed to

ensure the collection of reliable, reproducible field and laboratory analytical data.

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON 3.4.3.1 Soil Sample Collection from Monitoring Well Borings. Due to poor sample recovery or recovery of more rock fragments than soil, only one subsoil sample was collected during drilling activities. This sample was collected from boring SB1 (monitoring well location MW1) using a clean, 2-foot long, 2-inch inside diameter, stainless steel split-spoon sampler which was driven into the soil a distance of 18 inches at 5-foot sampling intervals, using a 140-lb hammer and a standard 30-inch drop height. The sampler was retrieved from the borehole, placed on a clean, flat surface, opened, and the sample was immediately scanned for the presence of volatile organic vapors using a photoionization detector (PID). The instrument reading was recorded on the field boring logs presented in Appendix E. The soil to be analyzed for the detection of volatile organic compounds was then placed directly into the appropriate sample containers. To avoid volatilization of contaminants, these containers were filled so that no headspace remained within the container. The following properties of the sample were then recorded on the field boring log: 1) sample length recovered, 2) presence of any slough in sampler, 3) basic soil type (e.g., sand, gravel, clay), 4) structure, 5) sorting, 6) grain size, 7) degree of saturation,

The soil required for the remaining chemical analyses was then placed into a stainless-steel bowl and mixed thoroughly using a disposable stainless steel spoon. The appropriate sample containers were filled with adequate volumes of material for the required analyses by separating the homogenized soil within the bowl into quadrants, and filling each container with an equal volume of soil taken from each quadrant. All sample information was recorded on the boring log form and a chain-of-custody form was prepared for the sample. Each of the properly labeled sample containers was placed in a separate resealable plastic bag to reduce the possibility of cross-contamination, and placed in a cooler with ice to maintain a temperature of 4° C for the duration of the sampling and transportation period. All sampling equipment was decontaminated between samples as described in Section 3.5, Equipment Decontamination.

8) color, 9) odor, 10) staining, and 11) presence of foreign materials.

3.4.3.2 Soil Sample Collection from Test Pit Excavations. A total of nine subsoil samples, including one duplicate sample, were collected during test pit excavation activities using disposable sampling equipment. Upon reaching an interval containing physical evidence of contamination, such as staining, odor, or elevated PID readings; the backhoe was used to collect soil from that interval. The backhoe was also used to collect the surface soil sample downgradient of the pesticide mixing area due to the overgrown vegetation in the area. The following sample collection procedure was used for these

samples. Once the backhoe had removed the soil, the bucket was placed on the ground next to the excavation and the soil within the bucket was immediately scanned for the presence of volatile organic vapors using the PID. Instrument readings were recorded on the associated test pit logs presented in Appendix F. Soil to be analyzed for the detection of VOCs was then placed directly into the appropriate sample containers using a disposable stainless steel spoon. To avoid volatilization of contaminants, these containers were filled so that no headspace remained within the container. In addition, care was taken to avoid collecting soils that were in contact with the bottom or sides of the backhoe bucket. The following properties of the sample were then recorded on the test pit log: 1) basic soil type (e.g., sand, gravel, clay), 2) structure, 3) sorting, 4) grain size, 5) degree of saturation, 6) color, 7) odor, 8) staining, and 9) presence of foreign materials.

The soil required for the remaining chemical analyses was then homogenized in place using the disposable stainless steel spoon. Again, care was taken to avoid homogenizing or collecting soils that were in contact with the backhoe bucket. The appropriate sample containers were then filled with adequate volumes of material for the required analyses by separating the homogenized soil in to quadrants and filling each container with an equal volume of soil taken from each quadrant. All sample information was recorded on the test pit log form and a chain-of-custody form was prepared for the samples. Each of the properly labeled sample containers was placed in a separate resealable plastic bag to reduce the possibility of cross-contamination and placed in a cooler with ice to maintain a temperature of 4° C for the duration of the sampling and transportation period. The backhoe bucket was decontaminated between samples as described in Section 3.5, Equipment Decontamination.

3.4.3.3 Background Surface Soil Sample Collection. A total of three background surface soil samples were collected using disposable sampling equipment. All surface debris was removed from the selected sampling location, along with the top 6 inches of soil in an area a minimum of 1 square foot in size. The soil within the sampling area was scanned for the presence of volatile organic vapors using the PID, and the instrument readings were recorded on the field sampling logs provided in Appendix F. The following properties of the sample were then recorded on the field sampling log: 1) basic soil type (e.g., sand, gravel, clay), 2) structure, 3) sorting, 4) grain size, 5) degree of saturation, 6) color, 7) odor, 8) staining, and 9) presence of foreign materials.

The soil from the interval between 6 inches and 1 foot BLS in the proposed sampling area required for chemical analysis was homogenized in place using a disposable stainless steel spoon. The appropriate sample containers were filled with adequate volumes of material for the required analyses by separating the homogenized soil in to quadrants, and filling each container with an equal volume of soil taken from each quadrant. All sample information was recorded on the field sampling log form and a chain-of-custody form was prepared for the samples. Each of the properly labeled sample containers was placed in a separate resealable plastic bag to reduce the possibility of cross-contamination and placed in a cooler with ice to maintain a temperature of 4° C for the duration of the sampling and transportation period.

### 3.4.4 Groundwater Monitoring Well Construction

Groundwater monitoring wells were installed in four of the five soil borings drilled onsite to the overburden/slide block interface. The construction logs associated with these wells are presented in Appendix G. Each well consisted of flush-threaded, Schedule 80, polyvinylchloride (PVC) casing composed, from bottom to top, of a 1-inch sand trap threaded to at least 10 feet of 0.010-inch factoryslotted screen and topped with blank casing. A 20-foot screened interval was installed in well MW4 due to the elevation of the groundwater encountered in this well in relation to the depth at which the slide block was encountered. In each well the screen extended a minimum of 5 feet above the static water level. A 10-foot screened interval was installed in well MW1 to accommodate unknown groundwater fluctuations, because groundwater was not encountered above the slide block at this location. The blank casing was cut to a length that placed the top of the casing string no more than 2.14 feet above the adjacent ground surface. The casing string was cleaned using pressurized hot water and then inserted into the boring through the hollow stem of the augers and filter pack material was placed around the well screen as the augers were removed from the boring. Filter pack material consisted of 20/40 Colorado well-rounded silica sand. The filter pack material in each well extends from the bottom of the boring to a minimum of 2 feet above the top of the screened interval, as measured with a weighted measuring tape.

With the exception of well MW1 which did not contain water, after placement of the filter pack the entire length of each well screen was surged. Cascade attaches the surge block to a 10-foot long, 50-lb stainless steel surge weight and then to a free fall sampling winch. This sampling winch is capable of lifting a 140-lb sampling weight as quickly as a cathead, but utilizes a free fall drop, similar to a cable

tool spudding wheel. However, the wells were surged using long, slow strokes of the surge block for a minimum of 5 minutes. The surge block was then removed from the well and the filter pack was checked for settlement using a weighted measuring tape. Additional filter pack material was added as necessary and the process was repeated until no change in the elevation of the filter pack was noticed after surging. The surge block and measuring tape were cleaned with pressurized hot water prior to use in each well. A minimum of 2 feet of bentonite chips was placed above the filter pack in each well as a sanitary seal. This seal was hydrated with potable water and allowed to expand for a minimum of 5 minutes prior to placement of the cement/bentonite grout. Cement/bentonite grout was placed above the sanitary seal to the ground surface using a tremie pipe. A 5-foot protective steel casing was installed over each completed monitoring well. A concrete pad sloped away from the well was constructed around the protective metal casing and three protective steel posts were installed around the concrete pad.

3.4.5 Groundwater Monitoring Well Development

Each groundwater monitoring well that yielded groundwater was developed 24 hours after completion of well installation using a dedicated, disposable polytetrafluoroethylene (PTFE), bottom-filling bailer. The well development logs are presented in Appendix G. Groundwater was removed from each well and a turbidity meter was used to measure the turbidity of the water removed from the well after each saturated casing volume. In cases where the water removed from the well was visually turbid, turbidity was measured at less frequent intervals until the water appeared clearer. Turbidity measurements were then taken at intervals of once per casing-volume of water removed. Bailing continued until the turbidity measurements remained within 10 percent of each other over three consecutive saturated casing volumes.

3.4.6 Groundwater Sample Collection

One groundwater sample was collected from each of the three groundwater monitoring wells that yielded water; specifically wells MW2, MW3, and MW4 (refer to Figure 5). These samples were collected 11 days after the completion of well development according to the following groundwater sampling procedures. The headspace within each well was immediately scanned upon opening using the PID and the instrument reading was recorded on the associated groundwater sampling log form. An electronic interface probe was then used to determine if a layer of petroleum product was present within the well. No product layers were detected within the three wells. A minimum of three saturated

casing volumes of water were removed from each well prior to sampling using a clean, dedicated,

disposable PTFE bailer. The temperature, pH, specific conductance, and turbidity of the purged water

were measured between each casing volume of water removed from the well, and these measurements

were recorded on the groundwater sampling log forms presented in Appendix G.

Groundwater was transferred from the well to the appropriate, pre-preserved, pre-labeled sample bottles

using the dedicated, disposable PTFE bailer at well location MW2, and the peristaltic pump with

dedicated polyethylene tubing, at well locations MW3 and MW4. The depth to groundwater in

monitoring well MW2 precluded the use of a peristaltic pump for sampling purposes. The groundwater

samples were collected in the order of volatilization sensitivity (i.e., volatile organic samples first, then

other organic samples). Volatile organic analysis (VOA) sample containers, in particular, were filled

carefully with minimum turbulence and aeration. VOA sample containers were filled so as to be

completely free of bubbles, and care was taken not to overfill the pre-preserved bottles. Each sample

container was sealed in a resealable plastic bag to reduce the possibility of cross-contaminating other

samples. The properly labeled and sealed sample bottles were placed in a cooler with ice to maintain a

temperature of 4° C for the duration of the sampling and transportation period. All the sample

information was recorded on the groundwater sampling log form and chain-of-custody documents were

completed for the samples.

3.4.7 Quality Control Sample Collection

A total of three quality control samples associated with the site inspection were submitted to the

analytical laboratory, including one groundwater duplicate, one soil replicate, and one trip blank

sample. These samples and their associated analyses are presented on Table 2.

Field duplicate and replicate samples were collected at the same time, in the same manner, and from

the same material as the associated primary sample. Field duplicate and replicate samples were

submitted to the laboratory for the identical analyses as the primary sample, but were given a different

sample number to allow evaluation of the reproducibility of both field collection and laboratory analysis

techniques.

No equipment rinse blank samples were collected because only one soil sample was collected during

hollow stem auger drilling using the split spoon sampler and no sediment samples were collected.

The trip blank sample containers were filled with distilled water by the laboratory and transported with

the remaining VOA sample containers through all stages of sample collection and transportation. These

samples were then analyzed for the presence of VOCs to determine if the sample containers had been

contaminated during any stage of sampling or transportation.

3.5 EQUIPMENT DECONTAMINATION

All non-expendable equipment used during the Bradford Island landfill site inspection was

decontaminated prior to, and after each use. The sampling equipment used during groundwater sample

collection was dedicated and disposable. Therefore, decontamination of groundwater sampling

equipment was not necessary. Tapes, well sounders, and water quality probes were rinsed in distilled

water, or cleaned in a tri-sodium phosphate solution and rinsed once with distilled water after each use.

Decontamination of sediment sampling equipment consisted of removing the gross contamination from

the equipment by brushing and then rinsing with tap water, washing the equipment in a solution of

alconox and tapwater, rinsing with tap water, and then rinsing with distilled water.

The drill rig and all drill bits and augers were decontaminated prior to commencing the first boring and

before leaving the site. In addition, the drill bits and augers were decontaminated between each boring

location. Decontamination of this equipment consisted of a pressurized hot water cleaning. All

pressurized hot water cleaning activities were performed within a self-contained decontamination

trailer. The backhoe was also decontaminated prior to commencing the first test pit and before leaving

the site. In addition, the backhoe bucket was decontaminated between each test pit and between

samples in the event that more than one sample was collected in a test pit. Decontamination of this

equipment consisted of removing the gross contamination from the equipment by brushing and power

washing the equipment with tap water. All decontamination water was contained and pumped into

DOT-approved 55-gallon drums.

Based on the scope of the sampling program at the landfill site, and to minimize the generation of

investigation-derived wastes, solvents were not used as a part of the decontamination process during the

site inspection for the following reasons:

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The only sampling activities during which non-disposable sampling equipment was

scheduled to be used were the collection of soil samples from monitoring well borings

and sediment sample collection. An effort was made to locate the monitoring well

borings outside the landfill site. In addition, given the history of the landfill, and the

sediment scouring that occurs within the Columbia River, the anticipated concentrations

of contaminants with the highest potential for carry-over—such as PCBs, oils, and

polynuclear aromatic hydrocarbon (PAH) compounds—were expected to be low in these

areas of investigation. Due to poor soil and sediment recoveries during the sampling

efforts performed during the site inspection, only one soil sample was collected from the

monitoring well borings, and no sediment samples were collected.

The typical procedure of air drying after the solvent wash is not easily achieved in the

Pacific Northwest and therefore the decontamination solvent could have been introduced

into future samples.

The analytical laboratory purchased, preserved (where appropriate), and supplied sample containers

that had been pre-cleaned in accordance with EPA specifications.

3.6 INVESTIGATION DERIVED WASTE

Investigation-derived waste (IDW) management activities included the proper transfer, labeling, and

storage of all waste media. All wastewater, including decontamination liquids and water purged from

the wells during sampling, was transferred into DOT-approved 55-gallon drums, as needed, and at the

end of each day. In addition, all drill cuttings accumulated during well installation were stored in

55-gallon drums. All 55-gallon drums containing IDWs were properly labeled and left onsite at the

request of the Project ECC's representative, for future transportation to a central storage location by

Project personnel.

Tetra Tech recommends that the IDW's generated during the site inspection be sampled by media to

determine disposal and/or treatment options. This would include collecting samples from the soil

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON cuttings derived from the borings drilled onsite, the decontamination water generated during site inspection field activities, and the purge water generated during monitoring well sampling activities performed onsite. Sample analyses should include Resource Conservation and Recovery Act (RCRA) metals using the toxicity characteristic leaching procedure (TCLP), diesel range TPH analyses, and any other analyses that may be required by the selected disposal/treatment facility.

SECTION 4.0 INVESTIGATION RESULTS

The following sections detail the results of site inspection performed at the Bradford Island landfill. These results include a summary of site lithology and hydrology derived from data obtained during soil boring, test pit installation, and well installation activities onsite. In addition, an estimate of the volume of material disposed within the landfill and the aerial extent of the landfill is provided, based on data obtained from the test pit excavations onsite. The analytical results of soil and groundwater samples collected during the landfill site inspection and a summary of the data quality evaluation performed are

4.1 SITE HYDROGEOLOGY

also included in this section.

Soils encountered during the drilling and excavation activities performed onsite consisted of a brown, well-graded, dense material with varying percentages of sand, gravel, and silt underlain by black fractured basalt to weathered dark gray ash tuff. At more shallow depths, the basalt had weathered along the fractures to form a clay matrix. In addition, the dark gray ash tuff encountered in these borings had a sandstone-like appearance. The unconsolidated material extended to depths of 2.5 feet BLS at test pit TP2 on the western edge of the landfill, 2 feet BLS at test pit TP3 on the eastern edge of the landfill, and greater than 11 feet BLS in the center of the landfill at test pit TP1 (refer to Figure 5). A gray, well-graded sand layer was encountered in test pit TP7 at 4 feet BLS which was observed to extend to a depth of over 7 feet BLS. This gray sand layer was also encountered in test pit TP8 at 1 foot BLS and extended to a depth of 2 feet BLS.

Groundwater was not encountered within any of the 8 test pit excavations. However, water was encountered beneath the site during drilling and well installation activities at depths ranging from approximately 17 feet BLS in the well MW4 boring to 32 feet BLS in the well MW2 boring. The shallow water encountered during drilling did not appear to be present uniformly across the area of investigation. Once these groundwater levels had stabilized following well installation, static water

levels measured prior to groundwater sampling ranged from 10.82 feet BLS in well MW2 to 17.82 feet

BLS in well MW3. The water level elevations measured at the onset of groundwater sampling are

presented adjacent to each groundwater monitoring well on Figure 5. Based on these groundwater

elevations, the shallow groundwater at the former Bradford Island landfill site is believed to be laterally

In addition, although a seep survey was performed to determine if the shallow

groundwater onsite was migrating to the Columbia River, no groundwater seeps were detected.

Therefore, estimates of groundwater flow direction and gradient have not been made based on this

single measurement event.

4.2 INVESTIGATION ACTIVITIES SUMMARY

The following sections provide a summary of the field activities performed during the Bradford Island

landfill site inspection and the conditions encountered.

4.2.1 Magnetometer Survey

Prior to conducting the fieldwork onsite, the site was surveyed by Applied Professional Services, Inc.

(APS) of Portland, Oregon using a Metrotech 810 magnetometer to ensure that the selected boring

locations were clear of any underground utilities or obstructions. In addition, an attempt was made to

determine the locations of the waste disposal areas identified during interviews with Bonneville Lock

and Dam Project personnel. Five separate but distinct potential waste disposal areas were identified.

Tetra Tech also used a Ferro-Trak™ FT-60 magnetic locator to better define the disposal areas

identified by APS and to aid in test pit placement. During test pit excavation, waste materials were

encountered in each of the five areas identified by APS during the magnetometer survey. These areas

correlate with test pits TP1, TP5, TP6, TP7, and TP8.

4.2.2 Soil Boring and Monitoring Well Installation

The project work plan specified installation of four soil borings to the overburden/slide block interface

beneath the site, using hollow stem auger drilling techniques. However, a total of five soil borings

were drilled after refusal was encountered at a depth of 7 feet BLS at boring location SB3. The field

logs associated with these borings are presented in Appendix E. Cascade Drilling, Inc. of Woodinville,

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Washington provided drilling services for the Bradford Island landfill site inspection. The project work plan also specified collection of two subsoil samples from each of the four planned soil borings. However, due the subsurface conditions encountered and resultant poor soil recovery during split-spoon sampling, only one subsoil sample was collected, which was designated as sample SB1-SS01, which was collected from boring SB1.

Groundwater monitoring wells were installed in the four completed soil borings to determine: 1) the gradient and/or direction of flow of the shallow groundwater beneath the site, 2) whether the waste materials present within the landfill had adversely impacted shallow groundwater and, if so, 3) whether contaminants were migrating offsite. Therefore, one well was placed adjacent to and on each side of the landfill to the north, east, south, and west (Figure 5). Well drilling efforts continued at each location until the top of the slide block was encountered. In addition, well MW2 was placed on the south side of the landfill, immediately adjacent to the pesticide mixing area, to determine if past practices had affected groundwater quality in this area. It should be noted that during drilling, a piece of metal was observed to have wrapped around the auger flights when they were removed from the boring placed on the north side of the landfill. The presence of this piece of metal and field observations during completion of test pit TP5 (refer to Figure 5) appear to indicate that monitoring well MW4 was installed at or inside the northern boundary of the landfill. The construction diagrams associated with the four groundwater monitoring wells are presented in Appendix G.

No groundwater was encountered above the slide block during the drilling of soil boring SB1 (well MW1). However, well MW1 was installed at this location in accordance with the work plan to monitor groundwater fluctuations in this area, as well as the potential for groundwater to be seasonally present at this location. Three of the four groundwater monitoring wells—MW2, MW3, and MW4—were subsequently developed according to the procedures presented in Section 3.4.5, Groundwater Monitoring Well Development. Well MW1 could not be developed because water was not present within the well. During development, groundwater infiltration rates were found to be low in wells MW2 and MW4. Well MW2 repeatedly purged dry after removal of each 2.5 gallons of water from the well, and well MW4 purged dry after removal of each 4 gallons of water from the well. The groundwater elevations measured within wells MW2 and MW3 on August 19, 1998, prior to well development activities, were 87.46 feet above msl and 97.55 feet above msl, respectively. These elevations are more than 13 feet higher than the forebay pool level measurement of 74.4 feet above msl

on that same day. The groundwater elevation of 97.54 feet above msl measured in well MW4 on August 20, 1998, prior to well development activities, is more than 22 feet higher than the forebay pool level measurement of 74.9 feet above msl on that same day.

#### 4.2.3 Surface Soil Sampling

Four surface soil samples were collected at the site during the landfill site inspection. Three of these samples were collected from areas outside the assumed landfill boundary, to determine the background concentrations of the 23 TAL metals present on Bradford Island. These samples were collected from a depth of 0.5 feet BLS. The fourth surface soil sample was collected from a location immediately adjacent to, and topographically down slope of the pesticide mixing area, to determine if past waste handling practices in this area had adversely impacted surficial soils in this area. This sample was collected from a depth of 1 foot BLS.

### 4.2.4 Test Pit Excavation and Sampling

A total of eight test pits were excavated onsite by Ganco Environmental Construction, Inc. of Gresham, Oregon. The field logs associated with these test pits are presented in Appendix F. The locations of test pits TP1, TP5, TP6, TP7, and TP8 were based on the results of the magnetometer survey performed onsite (Figure 5). Waste materials—including broken glass, metal debris, metal cables, asbestos-containing and non-asbestos-containing building materials, ceramic insulators, and household trash—were present within test pit TP1 from a depth of 2 feet BLS, to the total excavation depth of 11 feet BLS. One subsoil sample was collected from the south end of test pit TP1, at a depth of 11 feet BLS. Test pit TP5 was observed to contain rubber tires, broken glass, and what appeared to be crates of mercury vapor lamps. The soil present in test pit TP5 was observed to be black and oily from a depth of 2.5 feet BLS to the total excavation depth of 5 feet BLS. One subsoil sample was collected from the center of test pit TP5 at the completion depth of 5 feet BLS. Test pit TP6 contained two areas of petroleum hydrocarbon-stained sandy, gravelly silt, with some charcoal present from 2 feet BLS to the total excavation depth of 6.5 feet BLS. In addition, some metal debris and what appeared to be dried paint residue was present at the far west end of test pit TP6, from a depth of 4 feet BLS to the total excavation depth of 6.5 feet BLS. Two subsoil samples were collected from test pit TP6, one from each distinct area of staining. Sample TP6-SS-01 was collected from the stained area located toward the east end of test pit TP6 at a depth of 4 feet BLS. Sample TP6-SS-02 was collected from the stained area at the west end at a depth of 6.5 feet BLS. Test pit TP7 contained wood debris, fiberglass insulation, charcoal, plastic, and rubber hoses from a depth of 5 feet BLS to the total excavation depth of 7 feet BLS. These waste materials were present within a well-graded gray sand that extended from 4 feet BLS to the total excavation depth of 7 feet BLS. Sample TP7-SS-01 was collected within this well graded sand at a depth of 4.5 feet BLS, 0.5 feet above the waste materials present within this test pit. This well-graded gray sand layer was also observed to be present within test pit TP8 from 1 to 2 feet BLS. Test pit TP8 was observed to contain metal debris, glass bottles, metal pipes, charcoal, and concrete-asbestos board, from 2 feet BLS to the total excavation depth of 4 feet BLS. One subsoil sample was collected from approximately the center of test pit TP8 at a depth of 4 feet BLS.

Test pit TP2 was excavated at the west end of the landfill area to locate the western edge of the landfill. An area of petroleum hydrocarbon-stained silty, gravelly sand with some metal debris and cables was found at the east end of test pit TP2. One subsoil sample was collected from this stained area at a depth of 2 feet BLS. Test pits TP3 and TP4 were excavated at the east end of the landfill area to locate the eastern edge of the landfill. Consolidated, weathered, fractured basalt was encountered at a depth of 2 feet BLS throughout test pit TP3. No stained soil or waste materials were encountered in the test pit TP3 excavation. Therefore, no subsoil samples were collected from this test pit. One area of petroleum-stained gravelly, silty sand was present just east of the center of test pit TP4, that extended from 2 feet BLS to the contact with the consolidated, weathered, fractured basalt at 3.7 feet BLS in this area. One subsoil sample was collected from this stained area at a depth of 3.7 feet BLS.

### 4.2.5 Groundwater Sample Collection

Groundwater samples were collected from monitoring wells MW2, MW3, and MW4 according to the procedures presented in Section 3.4.6. A groundwater sample could not be obtained from monitoring well MW1 because no water was present within the well. It was not possible to purge or sample well MW2 using the specified peristaltic pump system, because the depth to groundwater within the well was beyond the lift capabilities of the pump. In addition, this well purged dry after removal of approximately 5 gallons of water from the well. The groundwater recovery rate in well MW2 was measured and calculated to be approximately 0.0096 feet per minute. Well MW4 was sampled using the peristaltic pump, but purging was completed using a disposable bailer. This well also purged dry after removal of approximately 7 gallons of water from the well. The groundwater recovery rate in well MW4 was measured and calculated to be approximately 0.6 feet per minute. The groundwater

elevations measured within these three wells prior to groundwater sampling activities on September 1,

1998, ranged from 105.74 feet above msl in well MW2 to 97.40 feet above msl in well MW3. These

elevations are more than 22 feet higher than the forebay pool level measurement of 75.2 feet above msl

on that same day.

4.2.6 Seep Survey and Sediment Sampling

A survey of the steep cliff surrounding the east end of Bradford Island was performed as described in

Section 3.4.2, Groundwater Seep Survey, to determine if the shallow groundwater present beneath the

site was seeping into the Columbia River. The limits of this survey are demarcated by the slash marks

presented on Figure 5. No evidence of groundwater seepage was observed during this survey. In

addition, Tetra Tech personnel visually examined the shallow water adjacent to the cliff face for signs

of the solid waste reportedly disposed in these areas. However, the river bottom was only visible on

the east end of the island due to limited water clarity and river depth at the time of the survey. No

waste materials were observed in this area during the visual survey.

Multiple sampling attempts were made to collect sediments from within the Columbia River adjacent to

the landfill site. Approximately 10 to 15 attempts to collect sediments were made immediately adjacent

to the north side of landfill. Water depths in this area ranged from approximately 20 to 50 feet. All

attempts to collect sediments resulted with either no retrieval of sediment or retrieval of only large

rocks and cobble that were unsuitable for sampling. Therefore, approximately five additional attempts

were made to collect sediments from further out in the river channel, north of the landfill site. Water

depths in this area ranged from approximately 75 to 100 feet. Sediment collection efforts at these

locations produced similar retrieval results as the sampling attempts closer to the shoreline.

A similar number of attempts were made to collect sediment in the river immediately adjacent to the

east side of the landfill. Water depths in this area at the time of sampling ranged from approximately

15 to 45 feet. The water in this area was observed to be at a lower surface flow velocity than

encountered on the north side of the island, and appeared to present a higher probability of sediment

accumulation on the river bottom in this area. However, after repeated attempts, no sediment could be

obtained. In addition, attempts were made to collect sediments from approximately 100 to 150 feet

from the east end of the landfill, in waters ranging from 50 to 75 feet in depth. Again, no sediment

could be obtained in this area.

4.3 SAMPLE ANALYTICAL RESULTS

The following sections summarize the analytical results of the soil, asbestos, groundwater, and quality

control samples collected during the site inspection activities conducted at the former Bradford Island

landfill. The laboratory analytical reports from the landfill site inspection are presented in

Appendix H. The complete analytical laboratory data package for the Bradford Island site inspection

effort is available in CENWP and Tetra Tech project files.

In addition to the screening criteria presented in the project work plan, all leachable metals

concentrations detected in the soil samples and all contaminant concentrations detected in the

groundwater samples have been compared to chronic freshwater criteria, due to the potential for these

contaminants to migrate to the Columbia River. In the comparison of sample results with applicable

screening levels, it is important to note that laboratory reporting limits for certain compounds and their

associated practical quantitation limits (PQLs) exceeded the corresponding screening levels. The

compounds for which PQLs exceeded screening levels were identified in the project Sampling and

Analysis Plan prepared prior to the site inspection (Tetra Tech 1997).

The additional compounds for which laboratory reporting limits in specific samples exceeded the

corresponding screening levels due to matrix effects or necessary sample dilution are outlined below:

■ The compound Alpha-BHC exceeds the DEQ numeric soil cleanup level (NSCL) in

samples TP1-SS-01, TP5-SS-01, TP6-SS-01, TP7-SS-01, and TP9-SS-01.

All of the PCB Aroclors exceed the DEQ NSCLs in samples TP1-SS-01, TP2-SS-01,

TP5-SS-01, TP6-SS-01, TP7-SS-01, and TP9-SS-01.

The compounds Gamma-BHC (Lindane) and Endrin exceed the DEQ NSCLs in sample

TP7-SS-01.

The compounds benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene,

chrysene, hexachloro-benzene, exceed the DEQ NSCLs in samples TP1-SS-01, TP2-SS-

01, TP5-SS-01, TP6-SS-01, TP6-SS-02, TP7-SS-01, TP8-SS-01, and TP9-SS-01.

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The PAH compounds benzo(b)pyrene and dibenzo(a,h)anthracene exceed both the DEQ

NSCLs and the EPA preliminary remedial goals (PRGs) in samples TP1-SS-01, TP2-SS-

01, TP5-SS-01, TP6-SS-01, TP6-SS-02, TP7-SS-01, TP8-SS-01, and TP9-SS-01.

The compounds 3,3'-dichlorobenzidine and n-nitrosodi-n-propylamine exceed the EPA

PRGs in samples TP1-SS-01, TP2-SS-01, TP5-SS-01, TP6-SS-01, TP6-SS-02, TP7-SS-

01, TP8-SS-01, and TP9-SS-01.

The compounds bis(2-chloroethyl)ether and hexachlorobenzene exceed the EPA PRGs in

samples TP5-SS-01, TP6-SS-01, TP7-SS-01, and TP8-SS-01.

The compound pentachlorophenol exceeds the DEQ NSCL in samples TP5-SS-01, TP6-

SS-01, TP7-SS-01, and TP8-SS-01.

The compounds indeno(1,2,3-cd)pyrene and pentachlorophenol exceed the EPA PRGs in

samples TP6-SS-01 and TP7-SS-01.

The compound bis(2-ethylhexyl)phthalate exceeds the DEQ NSCL in samples TP6-SS-01

and TP7-SS-01.

The compound 1,4-dichlorobenzene exceeds the EPA PRG in sample TP7-SS-01.

A summary report of the laboratory data quality evaluation performed on the analytical data associated

with this site inspection is provided in Appendix I. Any qualification of the data based on this data

quality evaluation are shown on the data summary tables included in this section, and are discussed in

Appendix I.

4.3.1 Surface Soil Samples

The following section presents the analytical results for the surface soil samples collected at the landfill

site. Three of these samples were collected to establish background metals concentrations on Bradford

Island. In addition, one surface soil sample was collected downgradient of the pesticide mixing area to

determine if past practices in this area had adversely impacted the environment. The locations of these

samples are shown on Figure 5.

4.3.1.1 Background Metals Concentrations. Soil samples were collected at three locations outside the

landfill boundaries to determine the background concentrations of metals on the island. All three

samples were analyzed for the presence of total TAL metals. In addition, two of the three samples also

underwent SPLP extraction and subsequent analysis for the presence of leachable TAL metals.

As shown on Table 3, all three of the background samples (denoted with a "BK" prefix) contained total

metal concentrations above the laboratory reporting limits. The arsenic concentration of 3.24 milli-

grams per kilogram (mg/kg) detected in background sample BK2-SS-01 exceeded the applicable EPA

PRG and the DEQ NSCL of 3 mg/kg. In addition, the leachable iron concentrations detected in the

two background samples that underwent SPLP extraction exceeded the applicable EPA freshwater

chronic criteria (FCC; Table 4). No other metals concentrations above the applicable screening levels

were detected in the three background samples.

4.3.1.2 Pesticide Mixing Area. The surface soil sample (PW1-SS-01) collected downgradient of the

pesticide mixing area to determine if past practices in this area had adversely impacted the environment

was analyzed for the detection of VOCs, SVOCs, pesticides, PCBs, herbicides, TPH, and TAL metals.

TAL metals concentrations were determined following SPLP extraction. The results of this sample are

summarized in Tables 4 through 9.

Volatile Organic Compounds--No VOCs were detected above laboratory reporting limits in the

surface soil sample collected downgradient of the pesticide mixing area (Table 5).

Semi-volatile Organic Compounds--No SVOCs were detected above the laboratory reporting

limits in the surface soil sample collected downgradient of the pesticide mixing area (Table 6).

Pesticides-Three organochlorine pesticides; 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT; were

detected above laboratory reporting limits in the surface soil sample collected downgradient of the

pesticide mixing area at concentrations of 2.29 micrograms per kilogram (µg/kg), 3.05 µg/kg, and

4.36 μg/kg, respectively (Table 7). However, these concentrations were consistently below both the

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# TABLE 3. TOTAL METALS IN SOIL SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON

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Target Analyte				Sampl	e Designation (1	mg/kg)	Appropriate	Applicable or Relevant and Appropriate Requirements (ARARs) (mg/kg)			
	BK1-SS-01	BK2-SS-01	BK3-SS-01	TP1-SS-01	TP4-SS-01	TP5-SS-01	TP6-SS-01	TP8-SS-01	TP9-SS-01 <sup>a</sup>	EPA (PRGs) <sup>b</sup>	DEQ (MASC) <sup>c</sup>
Silver	< 0.500	< 0.500	< 0.500	46.0	< 0.500	< 0.500	< 0.500	12.0	< 0.500	9,400	10,000
Aluminum	12,000	19,500	20,200	16,600	11,200	12,600	16,000	9,020	13,200	100,000	NC
Arsenic	2.77 (J)	3.24 (J)	2.92 (J)	9.73 (J)	2.18 (J)	3.04 (J)	1.75 (J)	5:35 (J)	2.11 (J)	3	3
Barium	77.0	95.5	139	567	84.6	136	87.6	156	98.3	100,000	140,000
Beryllium	< 0.500	0.554	0.622	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	3,400	1
Calcium	6180	8030	7890	9740	6610	5050	8870	6830	5420	NC	NC
Cadmium	< 0.500	0.575	< 0.500	195	< 0.500	4.54	1.60	5.03	3.55	930	1,000
Cobalt	11.4	18.9	17.5	17.2	8.28	9.02	7.92	10.7	7.93	29,000	NC
Chromium	11.9	19.2	21.3	60.1	9.12	14.0	9.34	13.5	12.6	450	1,500
Copper	45.0	49.9	53.6	1620	28.5	55.1	53.0	204	44.7	70,000	80,000
Iron	18,900	25,600	28,300	52,700	21,500	18,100	22,400	16,900	22,300	100,000	NC
Mercury	0.101	< 0.100	< 0.500	1.61	< 0.100	1.66	< 0.100	3.50	3.52	560	600
Potassium	204	962	764	1,180	865	1100	1020	826	1020	NC	NC
Magnesium	7,090	11,700	15,900	5,180	7,070	5,860	7,840	5,840	5,660	NC	NC
Manganese	368	610	460	1,830	273	362	211	381	290	45,000	200,000
Sodium	295 (J)	393 (J)	239 (J)	471 (J)	585 (J)	404 (J)	570 (J)	433 (J)	344 (J)	NC	NC
Nickel	16.3	24.2	19.2	84.0	14.0	17.7	20.4	21.3	15.3	37,000	40,000
Lead	14.2	18.7	8.67	7,140	189	193	1,120	403	151	1,000	2,000
Antimony	< 0.500	< 0.500	< 0.500	4.49	< 0.500	0.874	< 0.500	3.05	1.16	750	NC
Selenium	0.801	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	9,400	NC
Thallium	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	NC	NC
Vanadium	42.2	61.5	73.0	26.9	34.3	40.9	31.5	37.1	38.3	13,000	NC
Zinc	53.6	55.9	60.4	8,650	57.9	114	130	381	85.7	100,000	NC

Note: Shading indicates that sample concentration exceeds ARARs. Laboratory reporting limits that exceed ARARs have not been shaded.

a - Blind replicate of sample TP5-SS-01.

b - EPA Region 9 Preliminary Remedial Goals.

c - DEQ industrial maximum allowable soil concentration (OAR Chapter 340-122-045).

NC = No criteria exists for the associated analyte.

J = Estimated concentration.

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Beryllium	Target Analyte			Sample	e Designation (m	g/l)			Applicable or Relevar	nt and Appropriate Requ (mg/l)	uirements (ARARs)
Beryllium							-		EPA Freshwater	DEQ Freshwater	· · · · · · · · · · · · · · · · · · ·
Cadmium         < 0.00500 (UI)         < 0.00500         < 0.00500         < 0.00500         < 0.00500         < 0.00500         < 0.00500         0.00500         0.0011         0.051         0.051         0.058         0.0994         0.0343         0.144         0.0445         NC         NC         MO         400           Cobalt         < 0.0100 (UI)		SB1-SS-01	BK2-SS-01	BK3-SS-01	PW1-SS-01	TP2-SS-01	TP6-SS-02	TP7-SS-01	Chronic Criteria		DEQ (NSCL) <sup>c</sup>
Manganese	Beryllium		< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	NC	0.0053	0.002
Cobalt         < 0.0100 (UJ)         < 0.0100         < 0.0100         < 0.0100         < 0.0100         < 0.0100         < 0.0100         NC         NC         NC           Chromium         0.0120 (J)         < 0.0100	Cadmium	< 0.00500 (UJ)	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.001	0.0011	0.5
Chromium         0.0120 (J)         < 0.0100         0.0110         < 0.0100         < 0.0100         < 0.0100         NC         NC         10           Copper         0.0350 (J)         < 0.0300	Manganese	0.340 (J)	0.0546	0.0586	0.0994	0.0343	0.144	0.0445	NC	NC	400
Copper         0.0350 (J)         < 0.0300         < 0.0300         < 0.0300         < 0.0300         0.0300         < 0.0300         0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0300         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500 <th< td=""><td>Cobalt</td><td>&lt; 0.0100 (UJ)</td><td>&lt; 0.0100</td><td>&lt; 0.0100</td><td>&lt; 0.0100</td><td>&lt; 0.0100</td><td>&lt; 0.0100</td><td>&lt; 0.0100</td><td></td><td>NC NC</td><td>NC</td></th<>	Cobalt	< 0.0100 (UJ)	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100		NC NC	NC
Nickel   < 0.0300 (UJ)   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0300   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0400   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0500   < 0.0746   < 0.0500   < 0.110   < 0.110   < 0.110   < 0.110   < 0.010   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.100   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   < 0.040   <	Chromium	0.0120 (J)	< 0.0100	0.0110	< 0.0100	< 0.0100	< 0.0100	< 0.0100	NC	NC	10
Antimony         < 0.0400 (UJ)         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         < 0.0400         NC         1.6         NC           Silver         < 0.0500 (UJ)	Copper	0.0350 (J)	< 0.0300	< 0.0300	< 0.0300	< 0.0300	0.0302	< 0.0300	0.011	0.012	100
Silver         < 0.0500 (UJ)         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0500         < 0.0100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.005         < 0.005         < 0.005         < 0.005         < 0.005         < 0.005         <	Nickel	< 0.0300 (UJ)		< 0.0300	· < 0.0300	< 0.0300	< 0.0300	< 0.0300	0.16	0.160	10
Zinc         < 0.0500 (UJ)         < 0.0500         < 0.0500         < 0.0500         < 0.0500         0.0746         < 0.0500         0.1         0.110         NC           Thallium         < 0.100 (UJ)	Antimony	< 0.0400 (UJ)	< 0.0400	< 0.0400	< 0.0400	< 0.0400	< 0.0400	< 0.0400	NC	1.6	NC
Thallium         < 0.100 (UJ)         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         < 0.100         NC         0.040         NC           Iron         21.6 (J)         10.6         10.3         8.81         4.64         8.73         3.96         NC         1.0         NC           Selenium         < 0.150 (UJ)	Silver	< 0.0500 (UJ)	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	NC	0.00012	
Iron         21.6 (J)         10.6         10.3         8.81         4.64         8.73         3.96         NC         1.0         NC           Selenium         < 0.150 (UJ)	Zinc	< 0.0500 (UJ)			< 0.0500	< 0.0500	0.0746	< 0.0500	0.1	0.110	NC
Selenium         < 0.150 (UJ)         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         < 0.150         0.005         0.005         0.035         NC           Arsenic         < 0.200 (UJ)	Thallium	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC	0.040	ŅĊ
Arsenic         < 0.200 (UJ)         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.250         < 0.250         < 0.250	Iron	21.6 (J)	10.6	10.3	8.81	4.64	8.73	3.96	NC	1.0	NC
Potassium         1.78 (J)         0.207         < 0.200         0.472         < 0.200         0.394         0.657         NC         NC         NC           Lead         < 0.200 (UJ)	Selenium	< 0.150 (UJ)	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	0.005	0.035	NC
Lead         < 0.200 (UJ)         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         NC         NC         NC         NC           Barium         < 0.250 (UJ)	Arsenic	< 0.200 (UJ)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	0.190	NC	
Vanadium         < 0.200 (UJ)         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         < 0.200         NC         NC         NC         NC           Barium         < 0.250 (UJ)	Potassium	1.78 (J)	0.207	< 0.200	0.472	< 0.200	0.394	0.657	NC	NC	NC
Barium         < 0.250 (UJ)         < 0.250         < 0.250         < 0.250         < 0.250         < 0.250         < 0.250         NC         NC         NC         100           Calcium         5.55 (J)         2.71         2.38         2.03         9.50         1.85         1.52         NC         NC         NC         NC           Aluminum         10.2 (J)         7.90         6.75         5.18         2.21         5.61         2.06         NC         NC         NC           Magnesium         14.5 (J)         3.81         4.39         4.16         2.40         2.22         < 0.500	Lead	< 0.200 (UJ)		< 0.200	< 0.200	< 0.200	< 0.200	1.35	0.0025	0.0032	
Calcium         5.55 (J)         2.71         2.38         2.03         9.50         1.85         1.52         NC         NC         NC         NC           Aluminum         10.2 (J)         7.90         6.75         5.18         2.21         5.61         2.06         NC         NC         NC           Magnesium         14.5 (J)         3.81         4.39         4.16         2.40         2.22         < 0.500	Vanadium	< 0.200 (UJ)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NC NC	NC	NC
Aluminum         10.2 (J)         7.90         6.75         5.18         2.21         5.61         2.06         NC         NC         NC         NC           Magnesium         14.5 (J)         3.81         4.39         4.16         2.40         2.22         < 0.500	Barium	< 0.250 (UJ)	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	NC	NC	100
Magnesium 14.5 (J) 3.81 4.39 4.16 2.40 2.22 < 0.500 NC NC NC	Calcium	5.55 (J)	2.71	2.38	2.03	9.50	1.85	1.52	NC	NC	NC
	Aluminum	10.2 (J)	7.90	6.75	5.18	2.21	5.61	2.06	NC	NC	NC
Sodium 64.1 (1) 61.2 61.8 64.3 45.8 43.5 22.3 NC NC NC	Magnesium	14.5 (J)	3.81	4.39	4.16	2.40	2.22	< 0.500	NC	NC	
30010111 04.1 (J)   01.2   01.0   07.3   43.0   43.1 110   110   110	Sodium	64.1 (J)	61.2	61.8	64.3	45.8	43.5	22.3	NC	NC	NC
Mercury 0.00162 (J) < 0.00100 < 0.00100 < 0.00100 0.00196 < 0.00100 0.000012 0.000012 0.2	Mercury	0.00162 (J)	< 0.00100	< 0.00100	< 0.00100	< 0.00100	0.00196	< 0.00100	0.000012	0.000012	0.2

Note: Shading indicates that sample concentration exceeds ARARs. Laboratory reporting limits that exceed ARARs have not been shaded.

- a U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].
- b Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
- c DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- NC = No criteria exists for the associated analyte.
- J = Estimated concentration.
- UJ = Estimated as not detected above the laboratory reporting limit.

### TABLE 5. VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON AUGUST 1998

Target Analyte						Designation (s	mg/kg)					Appropriate	r Relevant and Requirements ) (mg/kg)
	SB1-SS-01	PW1-SS-01	TP1-55-01	TP2-SS-01	TP4-SS-01	TP5-SS-01	10-22-6°IT	TF6-\$\$-02	TP7-SS-01	T3-8-SS-01	TF9-55-01	FJ'A (PRGs)	DEQ (NSCL)
1.1,1,2-Tetrachloroethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	6.8	NC
1.1.1-Trichkoroethane	< 0.100 (UJ)	< 0.100	< 0 100 (UI)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	1,400	9
1.1.2.2-Tetrachloroethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100		NC
1,1,2-Trichloroethane	< 0.100 (U1)	< 0.100	< 0.100 (UJ)	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	22	0.08
1,1-Dichloroethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	0.112	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	2,000	NC_
1.1-Dichloroethene	< 0.100 (U1)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC	0.01
1,1-Dichloropropene	< 0 100 (UI)	< 0 100	< 0.100 (UJ)	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC	NC NC
1.2.3-Trichlorobenzene	< 0 100 (U1)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	NC NC
1,2,3-Trichloropropane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	0.0031	NC NC
1.2.4-Trichlorobenzene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100 < 0.100	< 0.100 0.448	1,700	NC NC
1,2-Dibromo-3-chloropropane	< 1.00 (UJ)	< 1.00	< 1.00 (UJ)	< 1.00	< 0.100 < 1.00	1.46	< 0.100 < 1.00	< 1.00	< 0.100 < 1.00	< 1.00	< 1.00	2.1	NC
1,2-Dibromoethane	< 0.100 (UI)	< 0.100	< 0 100 (UJ)	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	0.029	NC
1,2-Dichlorotenzene	< 0.100 (UI)	< 0.100	< 0.100 (07)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	370	NC NC
1,2-Dichloroethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.76	NC
1,2-Dichloropropane	< 0.100 (UI)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.76	NC
1,3,5-Trimethylbenzono	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0 100	< 0.100	0.57	< 0.100	< 0.100	< 0.100	< 0.100	0.189	70	NC
1,3-Dichlorobenzene	< 0.100 (UJ)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	_ < 0 100_	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	140	NC
1.3-Dichloropropane	< 0.100 (UI)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	NC	NC
1,4-Dichlorobenzene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	7	NC
2.2-Dichksropropane	< 0.100 (UJ)	< 0.100	<.0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	NC	NC
2-Butanone	< 2.00 (UJ)	< 2.00	< 2.00 (UJ)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NC	NC
2-Chlorotoluene	< 0 100 (UI)	< 0.100	< 0.100 (UJ)	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC.	NC
2-Hexanone	< 2.00 (UJ)	< 2.00	< 2.00 (UJ)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2 00	NC	NC
4-Chlorotoluene	< 0.100 (UJ)	< 0.100	< 0 100 (U/)	< 0,100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC	NC
4-Methyl-2-pentanone	< 2.00 (UJ)	< 2.00	< 2.00 (UJ)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NC	NC _
Acetone	< 2.00 (UJ)	< 2.00	< 2.00 (UJ)	< 2.00	< 2.00	< 2 00	< 2.00	< 2.00	< 2.00_	< 2.00	< 2.00	6,100	NC
Benzene	< 0.100 (UJ)	< 0 100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	1.4	0.1
Promobenzene	< 0 100 (UJ)	< 0.100	< 0.100 (UI)	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	92	NC
Bronochloromethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0 100	< 0.100_	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	NC	NC NC
Bromodichloromethane	< 0.100 (UJ)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	2,3	0.01
Remoform	< 0.100 (U1)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	380	0.3
Progremethane	< 0 100 (UJ)	< 0 100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	13	60
Carton disulfide	< 0 100 (UI)	< 0 100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	1,200	NC
Carton tetrachloride	< 0 100 (U1)	< 0.100	< 0.100 (UJ)	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	1	0.2
Chlorobenzene	< 0.100 (UJ)	< 0.100	< 0 100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	180	SO NC
Chloroethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0 100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	NC 1	0.4
Chloroform Chloromethane	< 0.500 (UI)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100 < 0.500	< 0.100	< 0.100	< 0.100	< 0.100	3	NC NC
cis-1.2-Dichloroethene	< 0.100 (U1)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	1 4
cis-1.3-Dichloropropene	< 0.100 (UI)	< 0.100	< 0.100 (U1)	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	NC
Dibromochloromethane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0 100	< 0.100_	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	36	NC NC
Dibromomethane	< 0.100 (UJ)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	_ < 0.100 _	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	NC	NC
Dichlorodifluoro methane	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	310	NC .
Ethylbenzene	< 0.100 (UJ)	< 0.100	<_0.100 (UJ)	< 0 100	< 0.100	0 228	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	230	100
Hexachlorobutadiene	< 0.100 (UJ)	< 0.100	< 0 100 (UJ)	< 0 100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	38	NC
Isopropylbenzene	< 0.100 (UJ)	< 0.100	< 0 100 (UJ)	< 0.100	< 0.100	< 0 100 .	< 0.100	< 0.100	< 0.100	< 0.100	< 0 100	NC	NC
ni,p-Xvlene	< 0.200 (UI)	< 0.200	< 0 200 (UI)	< 0.200	< 0.200	0.631	< 0.200	< 0.200	< 0.200_	< 0.200	< 0.200	210	800
Methylene chloride	< 1.00 (UJ)	< 1 00	< 1.00 (UI)	< 1.00	< 1.00	< 1.00	< 1.00	< 100	< 1.00	< 1.00	< 100	20	0.1
n-Butylbenzene	< 0.100 (UJ)	< 0 100	< 0.100 (U1)	< 0.100	< 0.100	0.422	< 0.100	< 0.100	< 0.100	< 0.100	0.146	550	NC
n-Propylbenzene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	0.172	< 0,100	< 0.100	< 0.100	< 0 100	< 0.100	550	NC
Naphthalene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	0.333	0.139	< 0 100	< 0.100	< 0 100	0.135	NC	.30
o-Xylene	< 0.100 (UJ)	< 0.100	< 0.100 (U1)	< 0.100	< 0.100	0.269	< 0.100	< 0 100	< 0.100	< 0 100	< 0.100	280	800
p Isopropyltoluene	< 0 100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	0.314	< 0,100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	NC
sec Hutylbenzene	< 0 100 (UJ)	< 0.100	< 0.100 (U1)	< 0.100	< 0 100	0.142	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	410	NC
Styrene	< 0.100 (UJ)	< 0.100	<_0.100 (U1)	< 0 100	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	1,700	NC NC
tert-Eutylbenzene	< 0.100 (UI)	< 0 100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100_	< 0.100	< 0.100	490	NC 0.3
Tetrachloroethene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	2.12	1.34	<del></del>	NC CO	
Toluene	< 0.100 (UJ)	< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	1.36	< 0 100	< 0.100	< 0.100	< 0.100	1.12 < 0.100	.520 NC	80
trans-1,2-Dichloroethene	< 0.100 (U1)	< 0.100	< 0.100 (UI)	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	NC NC
Trichloroethene	< 0.100 (UJ)	< 0 100	< 0.100 (UJ) < 0.100 (UJ)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NC NC	0.4
		< 0.100	< 0.100 (UJ)	< 0.100	< 0.100	< 0 100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	1,300	1,000
Trichlorofluoromethane	< 0 100 (UJ)												

a - Blind replicate of sample TPS-SS-01
b - BPA Region 9 Prolimonary Remedial Goals.
c - DEQ numerical soil cleanup levels (UAR Chapter 340-122-045).
NC = No criteria exist for the associated analyte.
U) = Estimated as not detected above the laboratory reporting limit.

## TABLE 6. SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON AUGUST 1998

Target Analyto			Appropriate	Relevant and Requirements I (mg/kg)									
	SB1-SS-01	PW1-5S-01	TP1-SS-01	TP2-SS-01	TP4-SS-01	TP5-SS-01	TI-6-SS-01	T1 %-SS-02	1P7-SS-01	TF8-SS-01	П9-88-01	EPA (PRG)	DEQ (NSCL)
1,2,4-Trichlorobenzene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 0.500 (UI)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UI)	1,700	NC
1,2-Dichlorubenzene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 0.500 (UI)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	370	NC
1,3 Dichlorobenzene	< 0.100 (UJ)	< 0.100	<_0.500	< 0.500_	< 0.100	< 2.50 (U1)	< 0.500 (111)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	140	NC NC
1,4-Dichlorobenzene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2 50 (UJ)	< 0.500 (UJ)	< 0.500	< 10.0 (UI)	< 2.50	< 2.50 (UI)	7.3	NC NC
2,4,5-Trichlorophenol	< 0.500 (UJ)	< 0,500	< 2.50	< 2.50	< 0.500	< 12.5 (UJ)	< 25.0 (UI)	< 2.50	< .50.0 (UI)	< 12.5	< 12.5 (UJ)	110,000	NC NC
2,4,6-Trichlorophenol 2,4-Dichlorophenol	< 0.100 (UJ) < 0.100 (UJ)	< 0.100	< 0.500 < 0.500	< 0.500 < 0.500	< 0.100 < 0.100	< 2.50 (UI) < 2.50 (UI)	< 5.00 (U1)	< 0.500	< 10.0 (UJ)	< 2.50 < 2.50	< 2,50 (UJ) < 2,50 (UJ)	270 3,200	NC NC
2.4-Dimethylphenol	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.60 (UI)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UI)	21.000	NC:
2,4-Dinitrophenol	< 0.500 (UI)	< 0.100	< 2.50	< 2.50	< 0.500	< 12.5 (UI)	< 25.0 (UI)	< 2.50	< 50.0 (UJ)	< 12.5	< 12.5 (UJ)	2,100	NC.
2,4-Dinitrotoluene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	2,100	NÇ
2.6-Dinitrotoluene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (U1)	< 0.500	< 10.0 (UI)	< 2.50	< 2,50 (UJ)	1,100	0.002
2-Chloropaphthalene	< 0 100 (UJ)	< 0.100	< 0.100	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	NC NC	NC:
2 Chlorophenol	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (U1)	< 5.00 (UJ)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UI)	240	NC
2-Methylmaphthalene	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (U1)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (U1)	NC	NC
2-Methylphenol	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.00 (U1)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UI)	53,000	NC.
2-Nitroaniline	< 0.500 (UJ)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (UJ)	< 25.0 (UJ)	< 2.50	< 50.0 (U1)	< 12.5	< 12.5 (UJ)	NC:	NC NC
2-Nitrophenol 3-Methylphenol	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ) < 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50 < 2.50	< 2.50 (UJ) < 2.50 (UJ)	53.000	NC.
4-Methylphenol	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.00 (U/)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	5,300	NC NC
3,3'-Dichlorobenzidine	< 5.00 (U1)	< 5.00	< 25.0	< 25.0	< 5.00	< 125 (UJ)	< 250 (UJ)	< 25.0	< .500 (UJ)	< 125	< 125 (UJ)	6.7	NC
3-Nitroaniline	< 0.500 (UJ)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (UJ)	< 25.0 (UJ)	< 2.50	< 50.0 (UJ)	< 12.5	< 12.5 (UJ)	NC	NC
4,6-Dinstro-2 methylphenol	< 0.100 (UJ)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (UJ)	< 25.0 (UJ)	< 2.50	< 50.0 (UJ)	< 12.5	< 12.5 (UJ)	NC	NC
4-Eromophenyi phenyi ether	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.00 (UJ)	< 0.500	< 10 0 (UJ)	< 2.50	< 2.50 (UJ)	NC	NC.
4-Chloro-3-methylphenol	< 0 100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UI)	< 2.50	< 2.50 (UI)	NC	NC
4-Chloroaniline	< 0.100 (U1)	< 0.100	< 0.500	< 0.500	< 0,100	< 2.50 (UJ)	< 3.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	4.300	NC
4 Chlorophenyl phenyl other	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (U))	NC NC	NC NC
4-Natroanilme 4-Natrophenol	< 0.500 (UJ) < 0.500 (UJ)	< 0.500 < 0.500	< 2.50 < 2.50	< 2.50 < 2.50	< 0.500	< 12.5 (UJ) < 12.5 (UJ)	< 25.0 (UJ) < 25.0 (UJ)	< 2.50 < 2.50	< 50.0 (UJ) < 50.0 (UJ)	< 12.5 < 12.5	< 12.5 (UJ) < 12.5 (UJ)	NC 66,000	NC NC
Acenaphthene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UI)	< 0.500	< 10.0 (UJ)	< 2.50	< 12.5 (UI) < 2.50 (UI)	370	2,000
Acenaphthylene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UJ)	NC NC	NC NC
Anilise	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5,00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	530	NC
Anthracene	< 0 100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	11 (1)	< 2.50	< 2.50 (UI)	222,000	20,000
fienzo (a) anthracene	< 0.100 (UI)	< 0.100	< 0.500	1.72	0.111	< 2.50 (UI)	6.31(3)	< 0.500	84.3 (3)	< 2.50	< 2.50 (UI)	3,600	0.1
Benzo (a) pyrene	< 0.100 (UJ)	< 0.100	< 0.500	2,05	< 0.100	< 2.50 (UJ)	6.03 (J)	< 0.500	103 (1)	< 2.50	< 2.50 (UJ)	0.36	0.1
Benzo (b) Ruoranthene	< 0.100 (U1)	< 0.100	< 0.500	2,88	0 132	< 2.50 (UJ)	7.61 (J)	< 0.500	134 (J)	< 2.50	< 2.50 (UI)	3,600	0.1
Benzo (ghi) perylene Benzo (k) fluoranthene	< 0.100 (UJ)	< 0.100	< 0.500	0.89	< 0.100	< 2.50 (UJ)	5,79 (J)	< 0.500	70.4 (J)	< 2.50	< 2.50 (UJ)	NC 36	NC 0.1
Renzoic Acid	< 0.500 (UJ)	< 0.100	2.50	< 2.50	< 0.100 < 0.100	< 2.50 (UJ) < 12.5 (UJ)	< 5.00 (UI) < 25.0 (UI)	< 2.50	< 50.0 (UI)	< 2.50 < 12.5	< 2.50 (UJ) < 12.5 (UJ)	100,000	NC
Benzyl alcohol	< 0.100 (U1)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (U1)	< 2.50	< 12.5 (U1)	100,000	NC NC
Bis(2-chloroethoxy)methane	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (U1)	< 2.50	< 2.50 (UI)	NC NC	NC
Bis(2-chloroethyl)ether	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	0.56	NC
Bis(2-chloroisopropyl)ether	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	74	NC
Bis(2-ethylhexyl)phthalate	< 0.500 (UJ)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (UJ)	< 25.0 (UJ)	< 2.50	73.4 (1)	< 12.5	< 12.5 (UJ)	210	4
Butyl benzył phthalate	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10 0 (UJ)	< 2.50_	< 2.50 (UJ)	930	NC
Cartezole	< 0.500 (UI)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (UI)	< 25.0 (UJ)	< 2.50	< 10.0 (UJ)	< 12.5	< 12.5 (UJ)	150	NC nc
Chrysene Di-n-butyl phthalate	< 0.100 (UJ)	< 0.100	< 0.500	< 2.50	0.13	< 2.50 (UJ) < 12.5 (UJ)	6:54 (J) < 25.0 (UJ)	< 0.500	89.8 (I) < 50.0 (UI)	< 2.50 < 12.5	< 2.50 (UJ) < 12.5 (UJ)	360 NC	0.1 NC
Di-n-octyl phthalate	< 0.300 (UI)	< 0.500	< 2.50	< 2.50	< 0.500	< 12.5 (U1)	< 25.0 (UI)	< 2.50	< 50.0 (UI)	< 12.5	< 12.5 (UI)	10,000	NC NC
Dibenz (a,h) anthracene	< 0.100 (UI)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	19.3 (1)	< 2.50	< 2.50 (UJ)	0.36	0.1
Dibenzofuran	< 0.100 (UJ)	< 0 100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	3,200	NC
Diethyl phthalate	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	100,000	NC.
Dimethyl phthalate	< 0 100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5 00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	100,000	NC:
Fluoranthene	< 0.100 (UI)	< 0.100	< 0.100	2.48	0.164	< 2.50 (UJ)	10.5 (J)	< 0.100	136 (J)	< 2.50	< 2.50 (UJ)	37,000	8,000
Fluorene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.00 (UI)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	22,000	2,000
Hexachlorobenzene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0 100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.100	< 10.0 (UJ)	< 2.10	< 2.50 (UJ)	1.9	0.4
Hexachlorobutadiene Hexachloroeyelopentadiene	< 0.100 (UJ) < 0.100 (UJ)	< 0.100 < 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500 < 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ) < 2.50 (UJ)	7,100	NC NC
Hexachloroethane	< 0.100 (01)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	210	100
Indeno (1,2.3-cd) pyrene	< 0.100 (UI)	< 0.100	< 0.500	1.56	< 0.100	< 2.50 (UJ)	5,19 (1)	< 0.500	· 72.9 (J)	< 2.50	< 2.50 (UJ)	3.6	NC NC
Imphorone	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	3,200	NC
N. Nitrosodi-n-propylamine	< 0.100 (UJ)	< 0 100	< 0.500	< 0.500	< 0.100	< 2.50 (UI)	< 5.00 (UJ)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	0.43	NC
N-Natrosodiphenylamine	< 0.200 (UJ)	< 0.200	< 1.00	< 1.00	< 0.200	< 5.00 (UJ)	< 10.0 (UJ)	< 1.00	< 20.0 (UJ)	< 5.00	< 5.00 (UJ)	610	NC
Naphthalene	< 0.100 (UJ)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5 00 (UI)	< 0.500	< 10.0 (UJ)	< 2.50	< 2.50 (UI)	190	30
Nitrobenzene	< 0.100 (U1)	< 0.100	< 0.500	< 0.500	< 0.100	< 2.50 (UJ)	< 5.00 (UJ)	< 0.100	< 10.0 (UJ)	< 2.50	< 2.50 (UJ)	100	NC
Pentachlorophenol	< 0.500 (U1)	< 0.100	< 2.50	< 2.50	< 0.500	< 12.5 (U1)	< 23.0 (UI)	< 2.50	< 50 0 (UI)	< 12.5	< 12.5 (UI)	15	3
l'henanthrene	< 0 100 (UJ)	< 0.100	< 0.500	0.709	< 0.100	< 2.50 (UI)	12.8 (J)	< 0.500	37.5 (J)	< 2.50	< 2.50 (UI)	NC 100 000	NC NC
Phenol Pyrene	< 0.100 (UI)	< 0.100	< 0.500	< 0.500 4.05	< 0.100 0.222	< 2.50 (UJ) < 2.50 (UJ)	< 5.00 (UI)	< 0.500 < 0.500	< 10.0 (UJ) 268 (J)	< 2.50	< 2.50 (UJ) < 2.50 (UI)	100,000 26,000	NC 6,000
	~ 0 100 (03)	~ V.100	-, v. 100		0.222	L ~ 4((U1)	1.7 0 (1)	~ VOV	200 (1)	~ 40	~ 2(0 (07)	10,000	5,000

Note: Shading indicates that rample concentration exceeds ARARs. Laboratory reporting limits that exceed ARARs have not been shaded.

a - Blind replicate of sample TF5-SS-01,
b - EFA Region 9 Preliminary Remedial Goals.
c - IVEQ numerical soil cleanup levels (OAR Chapter 340-122-045).

NC = No criteria exist for the associated analyte

UI = Estimated as not detected above the laboratory reporting limit

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### TABLE 7. ORGANOCHLORINE PESTICIDE AND PCB ANALYTES IN SOIL SAMPLES SITE INSPECTION

### BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON **AUGUST 1998**

Target Analyte		Sample Designation (ug/kg)										Applicable or Relevant an Appropriate Requirement (ARARs) (ug/kg)	
	SB1-	PW1-	TP1-	TP2-	TP4-	TP5-	TP6-	TP6-	TP7-	TP8-	TP9-	EPA	DEQ
	SS-01	<b>SS</b> -01	SS-01	<b>SS</b> -01	I0-22	<b>SS</b> -01	<b>SS</b> -01	SS-02	SS-01	SS-01	<b>SS</b> -01 <sup>a</sup>	(PRGs) <sup>b</sup>	(NSCL) <sup>C</sup>
4,4´-DDD	< 1.00 (UJ)	2.29 (UJ)	3060	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	NC	3,000
4,4´-DDE	< 1.00 (UJ)	3.05 (UJ)	1830	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	NC	2,000
4,4´-DDT	< 1.00 (UJ)	4.36 (J)	9520 (J)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	NC	2,000
Aldrin	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	180	NC
alpha-BHC	< 0.500 (UJ)	< 0.500 (UJ)	< 10.5 (UJ)	< 5.50 (UJ)	< 0.500 (UJ)	< 10.5 (UJ)	< 10.5 (UJ)	< 0.500 (UJ)	< 25.5 (UJ)	< 0.500 (UJ)	< 10.5 (UJ)	670	8
alpha-Chlordane	< 0.800 (UJ)	< 0.800 (UJ)	< 16.8 (UJ)	< 8.80 (UJ)	< 0.800 (UJ)	< 16.8 (UJ)	< 16.8 (UJ)	< 0.800 (UJ)	< 40.8 (UJ)	< 0.800 (UJ)	< 16.8 (UJ)	NC	NC
Aroclor 1016	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	6,300	80						
Aroclor 1221	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80						
Aroclor 1232	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80						
Aroclor 1242	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80
Aroclor 1248	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80
Aroclor 1254	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,800	80
Aroclor 1260	< 50.0 (UJ)	< 50.0 (UJ)	2250	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80
Aroclor 1262	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80
Aroclor 1268	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	1,300	80
beta-BHC	< 0.900 (UJ)	< 0.900 (UJ)	< 18.9 (UJ)	< 9.90 (UJ)	< 0.900 (UJ)	< 18.9 (UJ)	< 18.9 (UJ)	< 0.900 (UJ)	< 45.9 (UJ)	< 0.900 (UJ)	< 18.9 (UJ)	2,300	NC
Chlordane (tech)	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	12,000	500
delta-BHC	< 0.600 (UJ)	< 0.600 (UJ)	< 12.6 (UJ)	< 6.60 (UJ)	< 0.600 (UJ)	< 12.6 (UJ)	< 12.6 (UJ)	< 0.600 (UJ)	< 30.6 (UJ)	< 0.600 (UJ)	< 12.6 (UJ)	NC	NC
Dieldrin	< 2.00 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 22.0 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 42.0 (UJ)	< 2.00 (UJ)	< 102 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	190	1
Endosulfan I	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	6,400,000	0.6
Endosulfan II	< 2.00 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 22.0 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 42.0 (UJ)	< 2.00 (UJ)	< 102 (UJ)	< 2.00 (U1)	< 42.0 (UJ)	6,400,000	0.6
Endosulfan sulfate	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	NC	NC
Endrin	< 2.00 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 22.0 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 42.0 (UJ)	< 2.00 (UJ)	< 102 (UJ)	< 2,00 (UJ)	< 42.0 (UJ)	320,000	50
Endrin aldehyde	< 2.00 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 22.0 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	< 42.0 (UJ)	< 2.00 (UJ)	< 102 (UJ)	< 2.00 (UJ)	< 42.0 (UJ)	NC	NC
gamma-BHC (Lindane)	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	3,200	30
gamma-Chlordane	< 0.700 (UJ)	< 0.700 (UJ)	< 14.7 (UJ)	< 7.70 (UJ)	< 0.700 (UJ)	< 14.7 (UJ)	< 14.7 (UJ)	< 0.700 (UJ)	< 35.7 (UJ)	< 0.700 (UJ)	< 14.7 (UJ)	_NC	NC
Heptachlor	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	< 51.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	670	0.2
Heptachlor epoxide	< 1.00 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 11.0 (UJ)	< 1.00 (UJ)	< 21.0 (UJ)	< 21.0 (UJ)	< 1.00 (UJ)	85.1 (J)	< 1.00 (UJ)	< 21.0 (UJ)	330	0,3
Methoxychlor	< 4.00 (UJ)	< 4.00 (UJ)	< 84.0 (UJ)	< 44.0 (UJ)	< 4.00 (UJ)	< 84.0 (UJ)	< 84.0 (UJ)	< 4.00 (UJ)	< 204 (UJ)	< 4,00 (UJ)	< 84.0 (UJ)	5,300,000	NC
Toxaphene	< 50.0 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	< 1050 (UJ)	< 50.0 (UJ)	< 2550 (UJ)	< 50.0 (UJ)	< 1050 (UJ)	2,700	10
Note: Shading indicates t	hat sample co	ncentration e	ceeds ARAI	Rs.				c - DEO nu	merical soil	cleanup level	s (OAR Chapt	er 340-122-045	j).

Note: Shading indicates that sample concentration exceeds ARARs.

Laboratory reporting limits that exceed ARARs have not been shaded.

a - Blind replicate of sample TP5-SS-01.

b - EPA Region 9 Preliminary Remedial Goals.

c - DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).

NC = No criteria exist for the associated analyte.

J = Estimated concentration.

UJ = Estimated as not detected above the laboratory reporting limit.

### TABLE 8. HERBICIDE ANALYTES IN SOIL SAMPLES

## SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON AUGUST 1998

						7000	51 1998						
Target Analyte					Sample	Designation (	(ug/kg)					Appropriate Requ	r Relevant and pirements (ARARs) g/kg)
	SB1-SS-01	PW1-SS-01	TP1-SS-01	TP2-SS-01	TP4-SS-01	TP5-SS-01	TP6-SS-01	TP6-SS-02	TP7-SS-01	TP8-SS-01	TP9-SS-01 <sup>a</sup>	EPA (PRGs) <sup>b</sup>	DEQ (NSCL) <sup>C</sup>
2,4,5-T	< 20.0 (UJ)	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	NC	NC
2,4,5-TP (Silvex)	< 20.0 (UJ)												NC
2,4-D	< 5.00 (UJ)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	14,000,000	300
2,4-DB	< 20.0 (UJ)	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	8,600,000	NC
Dalapon	< 80.0 (UJ)	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	< 80.0	32,000,000	NC
Dicamba	< 5.00 (UJ)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	32,000,000	NC
Dichlorprop	< 15.0 (UJ)	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	NC	NC
Dinoseb	< 45.0 (UJ) < 45.0 < 45.0 < 45.0 51.2 < 10.0 < 45.0 < 45.0 < 10.0 < 45.0 < 10.0											1,100,000	NC
MCPA	< 750 (UJ)	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	NC	NC
MCPP	< 750 (UJ)	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	< 750	NC	NC

- a Blind replicate of sample TP5-SS-01.
- b EPA Region 9 Preliminary Remedial Goals.
- c DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- NC = No criteria exist for the associated analyte.
- UJ = Estimated as not detected above the laboratory reporting limit.

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# TABLE 9. PETROLEUM HYDROCARBONS IN SOIL SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON AUGUST 1998

	Sample Designation (mg/kg)										
Target Analyte	SB1-SS-01	PW1-SS-()1	TP1-SS-01	TP2-SS-01	TP4-SS-01	TP5-SS-01	TP6-SS-01	TP6-SS-()2	TP7-SS-01	TP8-SS-01	TP9-SS-01 <sup>a</sup>
		Ну	drocarbon I	dentification	(NWTPH-	HCID)		·	<del></del>	<u></u>	
Diesel Range Hydrocarbons	< 50.0 (UJ)	< 50.0	< 50.0	< 50.0	< 50.0	50.0	< 50.0	< 50.0	< 50.0	< 50.0	50.0
Gx Range Hydrocarbons	< 20.0 (UJ)	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
Heavy Fuel Oil Range Hydrocarbons	< 100 (UJ)	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Insulating Oil Range Hydrocarbons	< 100 (UJ)	< 100	100_	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Kerosene Range Hydrocarbons	< 50.0 (UJ)	< 50.0	< 50.0	< 50.0	< 50.0	50.0	< 50.0	< 50.0	< 50.0	< 50.0	50.0
Lube Oil Range Hydrocarbons	< 100 (UJ)	< 100	100	100	100	100	100	100	100	100	100
Diesel Range Hydrocarbons (NWTPH-Dx)											
Diesel Range Hydrocarbons	NA	NA	920	132	27.4	9,780	1,880	81.9	1,900	202	8,700
Lube Oil Range Hydrocarbons	NA	NA	2,360	342	136	20,200	4,040	533	2,790	951	31,400

Note: There are no federal or state ARARs associated with petroleum hydrocarbons.

a - Blind duplicate of sample TP5-SS-01.

UJ = Estimated as not detected above the laboratory reporting limit.

associated EPA PRGs (19,000  $\mu$ g/kg, 13,000  $\mu$ g/kg, and 13,000  $\mu$ g/kg, respectively), and the

associated DEQ NSCLs (3,000  $\mu$ g/kg, 2,000  $\mu$ g/kg, and 2,000  $\mu$ g/kg, respectively).

Polychlorinated Biphenyls--No PCBs were detected above laboratory reporting limits in the

surface soil sample collected downgradient of the pesticide mixing area (Table 7).

Herbicides--No herbicide compounds were detected above laboratory reporting limits in the

surface soil sample collected downgradient of the pesticide mixing area (Table 8).

Total Petroleum Hydrocarbons--Neither diesel nor heavy oil range TPH were detected above

laboratory reporting limits in the surface soil sample collected downgradient of the pesticide mixing

area (Table 9).

Metals--Leachate analyses revealed that seven of the 23 TAL metals were detected above the

laboratory reporting limits in the surface soil sample collected downgradient of the pesticide mixing

area, as shown on Table 4. The iron concentration of 8.81 mg/L detected in this sample exceeded the

associated DEQ FCC of 1.0 mg/L. No other metals concentrations detected exceeded the applicable

screening levels.

4.3.2 Subsoil Samples

The following section presents the analytical results of the subsoil samples collected at the landfill site.

One sample, SB1-SS-01, was collected during well installation from boring SB1 (monitoring well

location MW1) on the eastern edge of the landfill at a depth of 20 feet BLS in an attempt to evaluate the

potential influence of landfill leachate on subsoil quality in this area. Poor soil recovery prevented the

collection of additional subsoil samples from the remaining borings installed onsite. Sample SB1-SS-01

was analyzed for the presence of VOCs, SVOCs, pesticides, PCBs, herbicides, TPH, and TAL metals

following SPLP extraction (Tables 4 through 9).

Nine additional subsoil samples, including one field replicate sample, were collected from seven of the

eight test pits excavated onsite to evaluate the nature and extent of contamination within the landfill

area. Consolidated slide block material was encountered at a depth of 2 feet BLS in test pit TP3,

therefore no samples were collected from this boring. The nine test pit samples (denoted with a "TP"

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prefix) were analyzed for the presence of VOCs, SVOCs, pesticides, PCBs, herbicides, and TPH

(Tables 5 through 9). In addition, six of these nine samples, including the field replicate sample, were

analyzed for the presence of total TAL metals, while the remaining three samples were analyzed for the

presence of TAL metals following SPLP extraction (Tables 3 and 4). The corresponding sample

locations are shown on Figure 5.

Volatile Organic Compounds--No VOCs were detected above laboratory reporting limits in the

subsoil sample collected from boring SB1 (Table 5). VOCs were detected above laboratory reporting

limits in five of the nine subsoil samples collected from the test pit excavations onsite (Table 5). How-

ever, only the tetrachloroethene (PCE) concentrations of 2.12 mg/kg detected in sample TP7-SS-01 and

1.34 mg/kg detected in sample TP8-SS-01 exceed the applicable DEQ NSCL of 0.3 mg/kg.

Semi-volatile Organic Compounds--No SVOCs were detected above the laboratory reporting

limits in the subsoil sample collected from boring SB1 (Table 6). However, SVOC concentrations

above the associated laboratory reporting limits were detected in four of the nine subsoil samples

collected from the test pits excavated onsite; samples TP2-SS-01, TP4-SS-01, TP6-SS-01, and TP7-SS-

01 (Table 6). Of the SVOCs detected, the concentrations of chrysene detected in these four samples

exceeded the associated DEQ NSCL of 0.1 mg/kg. However, these concentrations did not exceed the

associated EPA PRG of 360 mg/kg. In addition to these SVOCs, the following SVOC concentrations

exceeded the specified screening levels.

The concentrations of benzo(a)anthracene and benzo(b)fluoranthene detected in samples

TP2-SS-01 and TP4-SS-01 exceeded the associated DEQ NSCLs, but not the EPA PRGs.

The concentration of these compounds detected in samples TP6-SS-01 and TP7-SS-01

exceeded both the DEQ NSCLs and the EPA PRGs.

The concentration of benzo(k)fluoranthene detected in sample TP2-SS-01 exceeded the

DEQ NSCL but not the EPA PRG. The concentration of benzo(k)fluoranthene detected

in sample TP7-SS-01 exceeded both the DEQ NSCL and the EPA PRG.

The concentrations of benzo(a)pyrene detected in samples TP2-SS-01, TP6-SS-01, and

TP7-SS-01, exceeded both the DEQ NSCL and the EPA PRG.

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The concentration of dibenz(a,h)anthracene detected in sample TP7-SS-01 exceeded both

the DEQ NSCL and the EPA PRG.

The concentration of indeno(1,2,3-cd)pyrene detected in sample TP2-SS-01 exceeded the

DEO NSCL, but not the EPA PRG. However, the concentrations of indeno(1,2,3-cd)-

pyrene detected in samples TP6-SS-01 and TP7-SS-01 exceeded both the DEQ NSCL and

the EPA PRG.

Pesticides--Pesticides were not detected above the laboratory reporting limits in the subsoil

sample collected from boring SB1 (Table 7). However, pesticide concentrations above the associated

laboratory reporting limits were detected in two of the nine test pit subsoil samples; samples TP1-SS-01

and TP7-SS-01 (Table 7). Of the analytes detected, the concentrations of 4,4'-DDD and 4,4'-DDT

detected in sample TP1-SS-01 exceeded the associated DEQ NSCLs. In addition, the concentration of

heptachlor epoxide detected in sample TP7-SS-01 also exceeded the associated DEQ NSCL, but not the

associated EPA PRG.

Polychlorinated Biphenyls--No PCBs were detected above the laboratory reporting limits in the

subsoil sample collected from boring SB1 (Table 7). However, PCB Aroclor 1260 was detected in

sample TP1-SS-01 at a concentration of 2,250 micrograms/kilogram (µg/kg), which exceeds both the

DEQ NSCL and the EPA PRG associated with this compound (Table 7).

Herbicides--No herbicide compounds were detected above laboratory reporting limits in the

subsoil sample collected from boring SB1 (Table 8). The herbicide dinoseb was detected in sample

TP4-SS-01 at a concentration of 51.2 μg/kg (Table 8). There is no DEQ NSCL associated with this

compound. However, this concentration is well under the EPA PRG of  $1,100,000 \mu g/kg$ .

Total Petroleum Hydrocarbons--Neither diesel nor heavy oil range TPH were detected above

laboratory reporting limits in the subsoil sample collected from boring SB1 (Table 9). However, both

diesel and heavy oil range TPH were detected above laboratory reporting limits in the nine subsoil

samples collected from the test pits excavated onsite (Table 9). There are no DEQ NSCLs or EPA

PRGs associated with TPH in soil. The DEQ has developed a soil matrix to calculate site-specific

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cleanup levels for petroleum hydrocarbons associated with underground storage tank sites (DEQ 1991). Regardless of the site specific matrix score, the maximum allowable concentration for diesel or heavier range TPH in soils under this matrix is 1,000 parts per million (ppm). The TPH concentrations

detected in the samples collected from test pits TP1, TP5, TP6, TP7, and TP8 exceeded this maximum

concentration.

Metals--Although leachable metals concentrations were detected above the associated

laboratory reporting limits in the subsoil sample collected from boring SB1, the detected concentrations

did not exceed the associated DEQ NSCLs (Table 4). In addition, the three test pit samples analyzed

for the presence of leachable metals contained concentrations above the associated laboratory reporting

limits. The concentrations of iron detected in these samples exceeded the associated DEQ FCC of

1.0 mg/L (Table 4).

Metals concentrations were also detected above the associated laboratory reporting limits in the six

samples analyzed for the detection of total TAL metals (Table 3). Of the total metals concentrations

detected, the arsenic concentrations reported for samples TP1-SS-01, TP5-SS-01, and TP8-SS-01

exceeded both the DEQ NSCL and the EPA PRG. However, the arsenic concentration of 3.04 mg/kg

detected in sample TP5-SS-01 was less than that detected in background sample BK2-SS-01. In

addition, the lead concentration detected in sample TP1-SS-01 exceeded both the DEQ NSCL and the

EPA PRG and the lead concentration detected in sample TP6-SS-01 exceeded the EPA PRG, but did

not exceed the DEQ NSCL.

4.3.3 Asbestos Samples

Three samples were collected, two from test pit TP1 and one from test pit TP8, of potentially asbestos

containing building materials identified within the materials present in these test pits. These samples

were delivered to EMSL Analytical, Incorporated of Seattle, Washington to be analyzed for the

presence of asbestos. The two samples collected from test pit TP1 consisted of black roofing paper

(sample ASB-01) and a silver mastic-type material attached to black roofing material (sample ASB-02).

A concentration of 45 percent chrysotile fibers was detected in sample ASB-01. The laboratory

separated the two materials present in sample ASB-02 and analyzed each individually. No asbestos

fibers were identified in these samples during analysis. The third sample of potentially asbestos-

containing building material, collected from test pit TP8 (sample ASB-03), consisted of dark gray

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transite, or concrete/asbestos board. A concentration of 22 percent chrysotile fibers was detected in

this sample. The presence of asbestos-containing materials (ACMs) in the landfill only becomes an

issue with regard to worker safety during excavation activities. In these cases, the Occupational Safety

and Health Administration (OSHA) has set a permissible exposure level (PEL) for airborne asbestos,

expressed as an 8-hour time weighted average (TWA), of 0.2 fiber per cubic centimeter (0.2 fiber/cm<sup>3</sup>)

of air. In addition, any excavation activities would potentially be subject to the National Emissions

Standards for Hazardous Air Pollutants (NESHAPs), the Oregon hazardous air pollutant regulations

[Oregon Administrative Rules (OAR) Chapter 340 Division 32], Oregon licensing and asbestos

certification requirements (OAR Chapter 340 Division 33), and the Oregon hazardous substance

remedial action rules (OAR Chapter 340 Division 122).

4.3.4 Groundwater Samples

The following section presents the analytical results of the groundwater samples collected in the vicinity

of the landfill site. A total of four groundwater monitoring wells were installed onsite (see Figure 5).

However, appreciable quantities of groundwater were only present in three of these four wells. The

fourth well was installed to monitor potential seasonal changes in groundwater elevation. Four

groundwater samples, including one field duplicate sample, were collected from these three monitoring

wells. These samples were analyzed for the presence of VOCs, SVOCs, pesticides, PCBs, chlorinated

herbicides, TPH, cyanide, and TAL metals. The analytical results of these groundwater samples are

summarized on Tables 10 through 16.

Volatile Organic Compounds--VOCs were detected above laboratory reporting limits in three of

the four groundwater samples collected at the landfill site (Table 10). The concentration of

tetrachloroethene detected in the sample collected from well MW3 exceeded both the EPA PRG and the

EPA maximum contaminant level (MCL). The DEQ has not established a numerical groundwater

quality reference level (NGQRL) for tetrachloroethene.

Semi-volatile Organic Compounds--No SVOCs were detected above laboratory reporting limits

in the four groundwater samples collected onsite (Table 11).

<u>Pesticides</u>--No pesticides were detected above laboratory reporting limits in the four

groundwater samples collected onsite (Table 12).

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### TABLE 10. VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER SAMPLES

### SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON AUGUST 1998

				AUGUST 1998					·
	Γ	Sample Des	ignation (ug/l)		Applicable or R	elevant and Appropr	iate Requir	ements (A	RARs) (ug/l)
Target Analyte					EPA Freshwater	DEQ Freshwater	EPA	EPA	DEQ (NGQRL)
	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01 <sup>8</sup>	Chronic Criteria	Chronic Criteria	(PRGs)	(MCLs)	NGWCL)
1,1,1,2-Tetrachloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	0.43	NC	NC
1.1.1-Trichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	790	200	200
1.1.2.2-Tetrachloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	2,400	0.055	NC	NC
1,1,2-Trichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC_	9,400	0.2	5	NC
1.1-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	810	NC_	NC
1,1-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	0.046	7	7
1.1-Dichloropropene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC NC
1,2,3-Trichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	NC 0000	NC NC	NC NC
1.2.3-Trichloropropane 1.2.4-Trichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	0.0016	NC 70	NC NC
1,2,4-Trimethylbenzene	< i.00 < i.00	< 1.00 < 1.00	< 1.00 < 1.00	< 1.00 < 1.00	NC NC	NC NC	190	NC NC	NC NC
1,2-Dibromo-3-chloropropane	< 5.00	< 5.00	< 5.00	< 5.00	NC NC	NC NC	0.048	0.2	NC NC
1,2-Dibromoethane	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	0.00075	NC	1,40
1,2-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	763	370	600	NC
1,2-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	20,000	0.12	5	5
1,2-Dichloropropane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	0.16	5	NC
1,3,5-Trimethylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	12	NC	NC
1,3-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	17	NC	NC
1,3-Dichloropropane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
I.4-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	0.47	75	75
2,2-Dichloropropane	< 1.00	< 1.00	< 1.00	< 1.00	NC .	NC	NC	NC	NC
2-Butanone	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC
2-Chlorotoluene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
2-Hexanone	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC NC	NC	NC	NC
4-Chlorotoluene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
4-Methyl-2-pentanone	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC
Acetone	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	610	NC	NC
Benzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC	0.39	5	5
Bromobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	20	NC NC	NC NC
Bromochloromethane	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	NC.	NC_	NC NC
Bromodichloromethane Bromoform	< 1.00 < 1.00	< 1.00 < 1.00	< 1.00 < 1.00	< 1.00 < 1.00	NC NC	NC NC	0.18 8.5	NC NC	NC NC
Bromomethane	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	8.7	NC NC	NC NC
Carbon disulfide	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	1.000	NC	NC NC
Carbon tetrachloride	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	0.17	5	5
Chlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	39	100	NC
Chloroethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
Chloroform	< 1.00	< 1.00	< 1.00	< 1.00	NC	1,240	0.16	NC	NC
Chloromethane	< 5.00	< 5.00	< 5.00	< 5.00	NC	NC	1.5	NC	NC
cis-1,2-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	70	NC
cis-1,3-Dichloropropene	< 1.00	< 1.00	< 1.00	< 1.00	NC	, NC	NC	NC	NC
Dibromochloromethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	l l	NC	NC
Dibromomethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
Dichlorodifluoromethane	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	390	NC	NC
Ethylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	1,300	700	700
Hexachlorobutadiene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	0.86	NC_	NC NC
isopropylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC NC	NC .	NC	NC 10,000
m.p-Xvlene	< 2.00	< 2.00	< 2.00	< 2.00	NC NC	NC NC	1.400	10,000	10,000
Methylene chloride	< 1.00	< 5.00 < 1.00	< 5.00 < 1.00	< 5.00	NC NC	NC NC	61	NC NC	NC NC
n-Butylbenzene				< 1.00		NC NC	61	NC NC	NC NC
n-Propylbenzene Naphthalene	< 1.00 < 1.00	< 1.00 < 1.00	< 1.00 < 1.00	< 1.00 < 1.00	NC NC	620	NC	NC NC	28
o-Xvlene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	1,400	10,000	10,000
p-Isopropyltoluene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC NC	NC NC	NC NC	NC NC
sec-Butvlbenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC	61	NC	NC NC
Styrene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	1.600	100	NC
tert-Butylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC	61	NC	NC NC
Tetrachloroethene	< 1.00	6,62	< 1.00	< 1.00	NC	NC	1.1	5	NC
Toluene	< 1.00	< 1.00	1.11	< 1.00	NC	NC	720	1,000	1,000
trans-1,2-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	100	NC
trans-1.3-Dichloropropene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
Trichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	2	- 5	5
Trichlorofluoromethane	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC _	1,300	NC	NC
Vinyl chloride	< 1.00	< 1.00	< 1.00	< 1.00	NC	110	0.02	2	2
	1								

Note: Shading indicates that sample concentration exceeds ARARs. Laboratory reporting limits that exceed ARARs have not been shaded.

a - Blind duplicate of sample MW4-GW-01.

b. U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))], c. Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
d. DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).

a - DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
 e - EPA Region 9 Preliminary Remedial Goals.
 f - Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020).
 J ≈ Estimated concentration.

UI = Estimated as not detected above the laboratory reporting limit.

## TABLE 11. SEMI-VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL

### CASCADE LOCKS, OREGON

				AUGUST	1996				
		Sample Desi	ignation (ug/l)		Applicable	or Relevant and Ap	propriate Requi	rements (ARAF	(ts) (ug/l)
Target Analyte					EPA Freshwater	DEQ Freshwater			DEQ (NGQR
	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01	Chronic Criteria	Chronic Criteria	EPA (PRGs)	EPA (MCLs)	NGWCL
1.2,4-Trichlorobenzene	< 5.00	< 5.00	< 5.00	< 5.00	NC	NC	190	70	NC
1.2-Dichlorobenzene	< 5.00	< 5.00	< 5.00	< 5.00	NC NC	763	370	600	NC.
1.3-Dichlorobenzene 1.4-Dichlorobenzene	< 5.00 < 5.00	< 5.00 < 5.00	< 5.00 < 5.00	< 5.00 < 5.00	NC NC	763 763	0.47	75	NC 75
2,4,5-Trichlerophenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	3,700	NC	NC
2.4.6-Trichlorophenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	970_	6.1	NC	NC NC
2.4-Dichlorophenol 2.4-Dimethylphenol	< 10.0 < 10.0	< 10.0	< 10.0 < 10.0	< 10.0 < 10.0	NC NC	365 NC	730	NC NC	NC NC
2.4-Dinitrophenol	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC	73	NC	NC
2,4-Dinitrotoluene	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	73	NC	NC
2.6-Dinitrotoluene 2-Chloronaphthalene	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	NC NC	NC _	37 NC	NC NC	NC NC
2-Chlorophenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	2,000	38	NC	NC
2-Methylnaphthalene	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC
2-Methylphenol	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC NC	1,800	NC NC	NC NC
2-Nitroanitine 2-Nitrophenol	< 20.0 < 5.00	< 20.0 < 5.00	< 20.0 < 5.00	< 20.0 < 5.00	NC NC	NC 150	2.2 NC	NC NC	NC NC
3-Methylphenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC NC	1,800	NC	NC
4-Methylphenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	180	NC	NC NC
3.3'-Dichlorobenzidine 3-Nitroaniline	< 20.0 < 10.0	< 20.0 < 10.0	< 20.0 < 10.0	< 20.0	NC NC	NC NC	0.15 NC	NC NC	NC NC
4,6-Dinitro-2-methylphenol	< 10.0	< 10.0	< 10.0	< 10.0 < 10.0	NC NC	NC NC	NC NC	NC NC	NC NC
l-Bromophenyi phenyi ether	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC
4-Chloro-3-methylphenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC NC
4-Chloroaniline -Chlorophenyl phenyl ether	< 5.00 < 10.0	< 5.00 < 10.0	< 5.00 < 10.0	< 5.00 < 10.0	NC NC	NC NC	150 NC	NC NC	NC NC
4-Nitroaniline	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC	NC NC	NC	NC
4-Nitrophenol	< 10.0	< 10.0	< 10.0	< 10.0	NC	150	2,300	NC	NC
Acensphthene	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	520	28,000	NC	420
Acenaphthylene Aniline	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	NC NC	NC NC	NC 12	NC NC	NC 2.100
Anthracene	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	1,800	NC	0.1
Benzo (a) anthracene	< 5.00	< 5.00	< 5.00	< 5.00	NC	NC	0.092	NC	0.2
Benzo (a) pyrene	< 5.00	< 5.00	< 5.00	< 5.00	NC NC	NC NC	0.0092	NC NC	NC NC
Benzo (b) fluoranthene Benzo (ghi) perviene	< 5.00 < 5.00	< 5.00 < 5.00	< 5.00 < 5.00	< 5.00 < 5.00	NC NC	NC NC	0.092 NC	NC NC	NC NC
Benzo (k) fluoranthene	< 5.00	< 5.00	< 5.00	< 5,00	NC NC	NC	0.92	NC	0.2
Benzoic Acid	< 20.0	< 20.0	< 20.0	< 20.0	NC	NC	150,000	NC	0.2
Benzyl alcohol Bis(2-chloroethoxy)methane	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0	NC NC	NC ·	11,000 NC	NC NC	NC NC
Bis(2-chloroethyl)ether	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC	0.0098	NC NC	NC NC
Bis(2-chloroisopropyl)ether	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	0.27	NC	NC
Bis(2-ethylhexyl)phthalate	< 20.0	< 20.0	< 20.0	< 20.0	NC NC	NC NC	4.8	NC NC	NC NC
Butyl benzyl phthalate Carbazole	< 5.00 < 10.0	< 5.00 < 10.0	< 5.00 < 10.0	< 5,00 < 10.0	NC NC	NC NC	7,300	NC NC	NC NC
Chrysene	< 5.00	< 5.00	< 5.00	< 5.00	NC	NC	9.2	NC	0.2
Di-n-butyl phthalate	< 5.00	< 5.00	< 5.00	< 5.00	NC	NC	NC	NC	NC
Di-n-octyl phthalate	< 5.00	< 5.00	< 5.00	< 5.00	NC NC	NC NC	730 0.0092	NC NC	NC NC
Dibenz (a,h) anthracene Dibenzofuran	< 5.00 < 10.0	< 5.00 < 10.0	< 5.00	< 5.00 < 10.0	NC NC	NC NC	24	NC NC	NC NC
Diethyl phthalate	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	29,000	NC	NC
Dimethyl phthalate	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	370,000	NC	NC
Fluoranthene Fluorene	< 5.00 < 10.0	< 5.00 < 10.0	< 5.00 < 10.0	< 5,00 < 10.0	NC NC	NC NC	1,500 240	NC NC	280 280
Hexachlorobenzene	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC NC	0.042	I I	NC NC
Hexachlorobutadiene	< 5.00	< 5.00	< 5.00	< 5.00	NC	9.3	0.86	NC	NC
lexachlorocyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00	NC	5.2	260	50	NC
Hexachloroethane Indeno (1,2,3-cd) pyrene	< 10.0 < 5.00	< 10.0 < 5.00	< 10.0 < 5.00	< 10.0 < 5.00	NC NC	540 NC	0.092	NC NC	NC 0.4
Isophorone	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	NC NC	71	NC NC	NC
I-Nitrosodi-n-propylamine	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	0.0096	NC	NC
N-Nitrosodiphenylamine	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	14	NC	NC NC
Naphthalene Nitrobenzene	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	< 10.0 < 10.0	NC NC	NC NC	6.2	NC NC	28 NC
Pentachlorophenol	< 10.0	< 10.0	< 10.0	< 10.0	13	13	0.56	1	NC NC
Phenanthrene	< 10.0	< 10.0	< 10.0	< 10.0	NC	NC	NC	NC	NC
Phenol	< 10.0	< 10.0	< 10.0	< 10.0	NC NC	2,560	22.000	NC NC	NC NC
Pyrene	< 5.00	< 5.00	< 5.00	< 5,00	NC	NC	180	NC	210

a - Blind duplicate of sample MW4-GW-01.
b - U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].

c - Oregon Administrative Rules, Chapter 340, Division 41, Table 20.

d - DEQ numerical soil cleanup levels (OAR Chapter 340-122-045). e - EPA Region 9 Preliminary Remedial Goals.

f · Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020). NC = No criteria exist for the associated analyte.

f = Estimated concentration.

UI = Estimated as not detected above the laboratory reporting limit.

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### TABLE 12. PESTICIDES IN GROUNDWATER SAMPLES

### SITE INSPECTION BRADFORD ISLAND LANDFILL

CASCADE LOCKS, OREGON

		Sample Desi	gnation (ug/l)		Applicable or F	televant and Approp	priate Requ	rements (A	ARARs) (ug/l)
Target Analyte					EPA Freshwater	DEQ Freshwater	ЕРА	EPA	DEQ (NGQRL/
	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-()1 <sup>a</sup>	Chronic Criteria b	Chronic Criteria	(PRGs) <sup>d</sup>	(MCLs) <sup>e</sup>	NGWCL) <sup>f</sup>
4,4´-DDD	< 0.0400	< 0.0400	< 0.0400	< 0.0400	0.001	NC	NC	NC	NC
4,4´-DDE	< 0.0300	< 0.0300	< 0.0300	< 0.0300	NC _	NC	NČ	NC	NC
4,4´-DDT	< 0.270	< 0.270	< 0.270	< 0.270	NC	0.001	NC	NC	NC
Aldrin	< 0.0400	< 0.0400	< 0.0400	< 0.0400	NC	NC	0.004	NC	NC
alpha-BHC	< 0.0200	< 0.0200	< 0.0200	< 0.0200	NC	NC	0.011	NC	NC
alpha-Chlordane	< 0.0200	< 0.0200	< 0.0200	< 0.0200	NC	NC	NC	NC	NC
beta-BHC	< 0.0300	< 0.0300	< 0.0300	< 0.0300	NC	NC	0.037	NC	NC
Chlordane (tech)	< 0.150	< 0.150	< 0.150	< 0.150	0.0043	0.0043	0.19	2	NC
delta-BHC	< 0.0200	< 0.0200	< 0.0200	< 0.0200	NC	NC	NC	NC	NC
Dieldrin	< 0.0700	< 0.0700	< 0.0700	< 0.0700	0.0019	0.0019	0.042	NC	NC
Endosulfan I	< 0.0300	< 0.0300	< 0.0300	< 0.0300	0.056	0.056	220	NC	NC
Endosulfan II	< 0.0500	< 0.0500	< 0.0500	< 0.0500	0.056	0.056	220	NC	NC
Endosulfan sulfate	< 0.0700	< 0.0700	< 0.0700	< 0.0700	NC	NC	NC	NC	NC
Endrin	< 0.0800	< 0.0800	< 0.0800	< 0.0800	0.0023	0.0023	11	2	0.2
Endrin aldehyde	< 0.0800	< 0.0800	< 0.0800	< 0.0800	NC	NC	NC	NC	NC
gamma-BHC (Lindane)	< 0.0300	< 0.0300	< 0.0300	< 0.0300	0.08	NC	0.052	0.2	4
gamma-Chlordane	< 0.0200	< 0.0200	< 0.0200	< 0.0200	NC	NC	NC	NC	NC
Heptachlor	< 0.0300	< 0.0300	< 0.0300	< 0.0300	0.0038	0.0038	0.015	0.4	NC
Heptachlor epoxide	< 0.0300	< 0.0300	< 0.0300	< 0.0300	0.0038	NC	0.0074	0.2	NC
Methoxychlor	< 0.500	< 0.500	< 0.500	< 0.500	NC	0.03	180	40	100
Toxaphene	< 1.50	< 1.50	< 1.50	< 1.50	0.0002	0.0002	0.061	3	5
	< 1.50						<del></del>		<del></del>

- a Blind duplicate of sample MW4-GW-01.
- b U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].
- c Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
- d DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- e EPA Region 9 Preliminary Remedial Goals.
- f Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020).
- NC = No criteria exist for the associated analyte.
- J = Estimated concentration.
- UJ = Estimated as not detected above the laboratory reporting limit.

### TABLE 13. POLYCHLORINATED BIPHENYLS IN GROUNDWATER SAMPLES

### SITE INSPECTION

### BRADFORD ISLAND LANDFILL

### CASCADE LOCKS, OREGON

		Sample Desi	gnation (ug/l)		Applicable or	Relevant and Appr	opriate Req	uirements (A	ARARs) (ug/l)
Target Analyte	į				EPA Freshwater Chronic Criteria	DEQ Freshwater Chronic Criteria	EPA	EPA	DEQ (NGQRL/
 	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01 <sup>a</sup>	(ug/l) <sup>b</sup>	(ug/I) <sup>c</sup>	(PRGs) <sup>d</sup>	(MCLs) <sup>e</sup>	NGWCL) <sup>f</sup>
Aroclor 1016	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	2.6	0.5	NC
Aroclor 1221	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.034	0.5	NC
Aroclor 1232	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.034	0.5	NC
Aroclor 1242	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.034	0.5	NC
Aroclor 1248	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.034	0.5	NC
Aroclor 1254	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.73	0.5	NC
Aroclor 1260	< 0.100	< 0.100	< 0.100	< 0.100	0.014	0.014	0.034	0.5	NC
Aroclor 1262	< 0.100	< 0.100	< 0.100	< 0.100	NC	0.014	0.034	0.5	NC
Aroclor 1268	< 0.100	< 0.100	< 0.100	< 0.100	NC	0.014	0.034	0.5	NC

- a Blind duplicate of sample MW4-GW-01.
- b U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].
- c Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
- d DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- e EPA Region 9 Preliminary Remedial Goals.
- f Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020).
- NC = No criteria exist for the associated analyte.
- J = Estimated concentration.
- UJ = Estimated as not detected above the laboratory reporting limit.

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### TABLE 14. HERBICIDES IN GROUNDWATER SAMPLES

## SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON

				7100031 12.				<del></del>	
		Sample Desi	ignation (ug/l)		Applicable or	Relevant and Appro	priate Requ	irements (A	ARARs) (ug/l)
Target Analyte					EPA Freshwater	DEQ Freshwater	EPA	EPA	DEQ (NGQRL/
	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01 <sup>a</sup>	Chronic Criteria b	Chronic Criteria <sup>c</sup>	(PRGs) <sup>d</sup>	(MCLs) <sup>e</sup>	NGWCL) <sup>f</sup>
2,4,5-T	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
2,4,5-TP (Silvex)	< 1.00	< 1.00	< 1.00	< 1.00	NC NC	NC	NC	50	10
2,4-D	< 0.500	< 0.500	< 0.500	< 0.500	NC	NC	370	70	100
2,4-DB	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	290	NC	NC
Dalapon	< 1.50	< 1.50	< 1.50	< 1.50	NC	NC	1,100	200	NC
Dicamba	< 0.500	< 0.500	< 0.500	< 0.500	NC	NC	1,100	_NC	NC
Dichlorprop	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	NC	NC	NC
Dinoseb	< 1.00	< 1.00	< 1.00	< 1.00	NC	NC	37	7	NC
MCPA	< 50.0	< 50.0	< 50.0	< 50.0	NC	NC	NC	NC	NC
MCPP	< 50.0	< 50.0	< 50.0	< 50.0	NC	NC	NC	NC	NC

- a Blind duplicate of sample MW4-GW-01.
- b U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].
- c Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
- d DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- e EPA Region 9 Preliminary Remedial Goals.
- f Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020).
- NC = No criteria exist for the associated analyte.
- J = Estimated concentration.
- UJ = Estimated as not detected above the laboratory reporting limit.

## TABLE 15. METALS IN GROUNDWATER SAMPLES SITE INSPECTION BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON

AUGUST 1998

	Sample Designation (mg/l)				Applicable or Relevant and Appropriate Requirements (mg/l)				
Target Analyte					EPA Freshwater	DEQ Freshwater	EPA	EPA	DEQ (NGQRL/
	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01 <sup>a</sup>	Chronic Criteria b	Chronic Criteria	(PRGs) <sup>d</sup>	(MCLs) <sup>e</sup>	NGWCL) <sup>f</sup>
Silver	< 0.00100	< 0.00100	< 0.00100	< 0.00100	NC	0.00012	0.18	NC	0.05
Arsenic	0.00808	< 0.00100	0.00228	0.00261	0.19	NC	0.000045	0.05	0.05
Barium	0.128	0.0233	0.264	0.249	NC	NC	2.6	2	I
Beryllium	< 0.00100	< 0.00100	< 0.00100	< 0.00100	NC	0.0053	0.073	0.004	NC
Calcium	4.51 (J)	20.7 (J)	72.6 (J)	72.9 (J)	NC	NC	NC	NC	NC
Cadmium	< 0.00100	< 0.00100	< 0.00100	< 0.00100	0.001	0.0011	0.018	0.005	0.01
Cobalt	0.00163	< 0.00100	0.00553	0.00562	NC	NC	2.2	NC	NC
Chromium	0.00351	0.00111	0.0035	0.00345	NC_	NC	NC	0.1	0.05
Copper	0.00567	0.00185	0.00761	0.00730	0.011	0.012	1.4	1.3	NC
Cyanide (total)	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.0052	0.0052	0.73	0.2	NC
Iron	4.34	< 0.150		8.88	NC	1	11	NC	NC
Mercury	< 0.00100	< 0.00100	< 0.00100	< 0.00100	0.000012	0.000012	NC	0.002	0.002
Potassium	5.15	1.54	4.7	4.91	NC	NC	NC	NC	NC
Magnesium	1.17	6.49	16.4	16.7	NC	NC	NC	NC	NC
Manganese	0.0987	0.348	2.49	2.68	NC	NC	1.7	NC	NC
Sodium	49.2	5.89	9.26	10.3	NC	NC	NC	NC	NC
Nickel	0.00246	0.00247	0.00939	0.00902	0.16	0.16	0.73	NC	NC
Lead	0.00771	< 0.00100	0.0123	0.0108	0.0025	0.0032	0.004	0.015	0.05
Antimony	0.00108	< 0.00100	< 0.00100	< 0.00100	NC	1.6	0.015	0.006	NC
Selenium	0.00148	< 0.00100	< 0.00100	< 0.00100	0.005	0.035	0.18	0.05	0.01
Thallium	< 0.00100	< 0.00100	< 0.00100	< 0.00100	NC	0.04	NC	0.002	NC
Vanadium	0.0119	< 0.00100	0.00691	0.00663	NC	NC	0.26	NC	NC
Zinc	0.0268	< 0.0100	0.0237	0.0238	0.1	0.11	11	NC	NC
Aluminum	3.48	0.107	1.46	1.63	NC	NC	37	NC	NC

Note: Shading indicates that sample concentration exceeds ARARs. Laboratory reporting limits that exceed ARARs have not been shaded.

- a Blind duplicate of sample MW4-GW-01.
- b U.S. EPA criteria for priority toxic pollutants for freshwater [Criterion Continuous Concentration (40 CFR, Chapter 1, Part 131, Section 36 (b)(1))].
- c Oregon Administrative Rules, Chapter 340, Division 41, Table 20.
- d DEQ numerical soil cleanup levels (OAR Chapter 340-122-045).
- e EPA Region 9 Preliminary Remedial Goals.
- f Oregon Department of Environmental Quality (DEQ) numerical groundwater cleanup levels [OAR Chapter 340-122-242(4)] and numerical groundwater quality reference levels (OAR Chapter 340-040-0020).
- NC = No criteria exist for the associated analyte.
- J = Estimated concentration.
- UJ = Estimated as not detected above the laboratory reporting limit.

### TABLE 16. PETROLEUM HYDROCARBONS IN GROUNDWATER SAMPLES

### SITE INSPECTION ...

### BRADFORD ISLAND LANDFILL CASCADE LOCKS, OREGON

**AUGUST 1998** 

	Sample Designation (mg/l)									
Target Analyte	MW2-GW-01	MW3-GW-01	MW4-GW-01	MW5-GW-01 <sup>a</sup>						
Hydrocarbon Identification (NWTPH-HCID)										
Diesel Range Hydrocarbons	< 0.630	< 0.630	< 0.630	< 0.630						
Gx Range Hydrocarbons	< 0.250	< 0.250	< 0.250	< 0.250						
Heavy Fuel Oil Range Hydrocarbons	< 0.630	< 0.630	< 0.630	< 0.630						
Insulating Oil Range Hydrocarbons	< 0.630	< 0.630	< 0.630	< 0.630						
Kerosene Range Hydrocarbons	< 0.630	< 0.630	< 0.630	< 0.630						
Lube Oil Range Hydrocarbons	< 0.630	< 0.630	< 0.630	< 0.630						
Gasoline Range Hydrocarbons (NWTPH-Gx)										
Gasoline Range Hydrocarbons	< 50.0	< 50.0	< 50.0	< 50.0						
Diesel Range Hydrocarbons (NWTPH-Dx)										
Diesel Range Hydrocarbons	0.502	< 0.250	0.332	0.340						
Lube Oil Range Hydrocarbons	< 0.500	< 0.500	< 0.500	< 0.500						

Note: There are no federal or state ARARs associated with petroleum hydrocarbons.

a - Blind duplicate of sample MW4-GW-01.

J = Estimated concentration.

UJ = Estimated as not detected above the laboratory reporting limit.

Polychlorinated Biphenyls--No PCBs were detected above laboratory reporting limits in the

four groundwater samples collected onsite (Table 13).

Herbicides—No herbicide compounds were detected above laboratory reporting limits in the

four groundwater samples collected onsite (Table 14).

Cyanide—Cyanide was not detected above laboratory reporting limits in the four groundwater

samples collected onsite (Table 15).

Metals--TAL metals concentrations were above laboratory reporting limits in all four of the

groundwater samples collected at the site (see Table 15). Of the TAL metals concentrations detected,

the concentration of arsenic detected in the samples collected from wells MW2 and MW4 exceeded

their corresponding EPA PRGs, but did not exceed the EPA MCLs or the DEO NGORLs. The

concentrations of iron detected in the samples collected from wells MW2 and MW4 exceeded the

associated DEQ FCC of 1.0 mg/L. Neither an EPA MCL or a DEQ NGQRL has been established for

manganese. However, the manganese concentration detected in the samples collected from well MW4

exceeded the associated EPA PRG. In addition, the concentrations of lead detected in the samples

collected from well MW4 exceeded both the associated DEQ FCC and the EPA PRG.

Total Petroleum Hydrocarbons--Heavy oil range TPH was not detected above the laboratory

detection limits in the groundwater samples collected at the site. However, diesel range TPH was

detected above the laboratory detection limit in the groundwater sample collected from well MW2 at

concentrations of 0.502 milligrams/liter (mg/L), and the two samples collected from MW4 at

concentrations of 0.332 mg/L and 0.340 mg/L (Table 16). No EPA PRGs, EPA MCLs, or DEQ

NGQRLs have been established for petroleum hydrocarbons in water. However, the Oregon DEQ has

established a risk-based approach to evaluate sites with petroleum hydrocarbons present in

groundwater, based on the presence of the more hazardous constituents typically present in petroleum

hydrocarbons; specifically BTEX and PAHs. Neither BTEX nor PAH compounds were detected above

the laboratory reporting limits in any of the groundwater samples collected at the site.

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4.4 LANDFILL VOLUME ESTIMATE

During test pit excavation at the landfill site, waste materials were encountered throughout some test

pits, while other test pits contained waste materials in discrete horizons. Therefore, the landfill likely

developed as a result of disposal in discrete areas rather than continuous lateral placement. However,

conservative estimates of the aerial extent of the landfill and the volume of material buried within the

landfill have been developed based on the test pit observations, the presence of elevated TPH

concentrations in samples collected from the test pits, and the assumption that the landfill is laterally

continuous rather than discontinuous. Therefore, the landfill is estimated to cover an area of

approximately 0.5 acres, based on elevated TPH concentrations present in test pit samples. Given that

waste materials continued to be present at the maximum excavation depths in some test pits,

approximately 5 feet of depth has been added in these areas to estimate the volume of waste present.

Therefore, the depths to which the wastes within the landfill extend are estimated to range from

approximately 8 to 16 feet BLS. Accordingly, approximately 8,800 cubic yards of material are

estimated to be present within the landfill site. The cross-sections and calculations used to derive these

estimates are presented in Appendix J.

4.5 DATA QUALITY ASSURANCE/QUALITY CONTROL EVALUATION

The following section provides a summary of the analytical results associated with the field quality

control samples collected during the landfill site inspection. An analytical data quality evaluation report

that provides a more detailed quality assurance/quality control review of the entire laboratory data

package is presented in Appendix I. Field quality control samples collected during the site inspection

included field duplicate samples associated with both the soil and groundwater samples, and a trip blank

sample associated with the groundwater samples.

4.5.1 Field Duplicate Samples

Two field duplicate samples, one soil and one groundwater, were collected during the landfill site

inspection. A discussion of the relative percent differences (RPDs) between these duplicate samples is

included in the data quality evaluation report presented in Appendix I. Based on this data quality

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evaluation, the RPDs calculated for these field duplicate samples were in agreement according to COE specified criteria (COE-CRERL 1996).

#### 4.5.2 Trip Blank Sample

One trip blank sample was analyzed for the detection of VOCs during the landfill site inspection. Carbon disulfide and methylene chloride were detected above their associated laboratory reporting limits in this sample. However, methylene chloride was also detected in the associated method blank and is considered a common laboratory artifact, and carbon disulfide was not detected in any of the environmental samples collected at the site. Therefore, no qualification of the associated sample data was deemed necessary.

SECTION 5.0 SUMMARY AND CONCLUSIONS

The following sections summarize the field activities performed during the landfill site inspection, and the results of these field activities by area of concern. Also included is a discussion of the analytical results of the surface soil, subsoil, asbestos, and groundwater samples collected onsite in relation to the identified screening levels. In addition, recommendations have been provided for further site investigation and/or remediation activities, as appropriate.

5.1 PROJECT BACKGROUND

The Bradford Island landfill site inspection field activities were conducted in two phases. The first phase of field work, from August 17, 1998 through August 20, 1998, included the collection of four surface soil and 10 subsoil samples. Three of the four surface soil samples were collected in background locations outside the landfill area to determine background metal concentrations on Bradford Island. The fourth surface soil sample was collected downgradient of the pesticide mixing area to determine if residual pesticides had adversely impacted the environment as a result of past practices in this area. Nine of the 10 subsoil samples, including one field replicate sample, were collected from the eight test pits excavated at the site to define the western boundary of the former landfill, and the exact locations of the disposal pits identified in prior interviews with Project personnel. In addition, three samples of building materials thought to potentially contain asbestos were collected from these test pits to determine if past disposal practices could pose a threat to human health. One additional subsoil sample was collected from one of the five soil borings drilled onsite using hollow stem auger techniques. Groundwater monitoring wells were installed in four of these five borings and these wells were also developed during this first phase of fieldwork. In addition, the elevation and horizontal coordinates of each sample location and each monitoring well were surveyed.

The second phase of fieldwork, conducted September 1 and 2, 1998, included the collection of four groundwater samples from three of the groundwater monitoring wells installed onsite to determine if

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON DACW57-96-D0009/TASK ORDER 0010 past disposal practices had adversely impacted groundwater in the landfill area. In addition, a visual

survey was conducted of the island for the presence of groundwater seeps to determine if precipitation

that infiltrates the fill materials in the vicinity of the former landfill migrates horizontally along the fill-

slide block interface and enters the Columbia River via groundwater seeps. An attempt was also made

to collect sediment samples from the Columbia River adjacent to the landfill site to determine if past

disposal practices had adversely impacted the environment and/or could pose a threat to human health

or ecological resources. However, multiple sampling attempts were made at each of the potential areas

of concern; including the area north of the landfill site and the area east of the landfill, from just off the

shore of the island to near mid-channel, and no sediment could be obtained due to scouring and the

composition of the remaining river bed materials.

All soil and groundwater samples were submitted to North Creek Analytical Laboratory in Bothell,

Washington, for analysis. Project QA split samples were delivered to the COE, Chemical Quality

Assurance Branch Laboratory in Omaha, Nebraska for analysis.

The specific analyses performed on samples collected from each area of investigation have been

summarized on Table 2. These analyses were selected based on past waste disposal activities as

reported in background information reviewed in preparation for the site inspection.

5.2 PESTICIDE MIXING AREA

Although the surface soil sample collected downgradient of the pesticide mixing area contained

detectable concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT, these concentrations did not exceed

either the EPA PRGs or the DEQ NSCLs for these compounds. Seven of the 23 TAL metals analyzed

following SPLP extraction were also detected above the laboratory reporting limits. However, none of

these concentrations exceeded applicable EPA or DEQ screening levels. In addition, no VOC, SVOC,

PCB, chlorinated herbicide, or TPH constituents were detected above laboratory reporting limits in the

surface soil sample collected in this area.

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON 5.3 LANDFILL SITE

Samples collected within the landfill site included 10 subsoil samples, three building material samples,

and four groundwater samples. One subsoil sample was collected from one of the five soil borings

drilled onsite during well installation activities using hollow stem auger drilling techniques. Contami-

nant concentrations exceeding applicable EPA and DEQ screening levels were not detected in this

subsoil sample.

Nine of these subsoil samples, including one replicate soil sample, were collected from seven of the

eight test pits excavated in and around the landfill site. TPH concentrations were detected above

laboratory reporting limits in all nine of these samples. No EPA PRGs or DEQ NSCLs have been

established for TPH concentrations. However, the TPH concentrations detected in the soil samples

collected from test pits TP1, TP5, TP6, TP7, and TP8 exceeded the maximum allowable concentration

established by DEQ for diesel or heavier range TPH in soils at underground storage tank sites of

1,000 ppm (DEQ 1991).

Pesticides concentrations exceeding DEQ NSCLs were detected in the samples collected from test pits

TP1 and TP7. However, these concentrations did not exceed the associated EPA PRGs. The sample

collected from test pit TP1 also contained a PCB concentration that exceeded both the EPA PRG and

the DEQ NSCL. The sample collected from test pit TP4 contained a dinoseb concentration above the

laboratory reporting limit. However, the concentration detected did not exceed the EPA PRG and the

DEQ has not established a NSCL for dinoseb. Tetrachloroethene concentrations exceeding the DEQ

NSCL were detected in the samples collected from test pits TP7 and TP8. However, these

concentrations did not exceed the EPA PRGs established for these compounds. SVOC concentrations

exceeding both the DEQ NSCLs and the EPA PRGs were detected in the samples collected from test

pits TP2, TP6, and TP7. In addition, SVOC concentrations exceeding only the DEQ NSCLs were

detected in the sample collected from test pit TP4. Total arsenic and lead concentrations exceeding

both the DEQ NSCLs and the EPA PRGs were detected in the samples collected from test pits TP1,

TP5, TP6, and TP8. Arsenic was also detected at a concentration slightly exceeding the associated

screening levels in one of the three background soil samples. The concentration of arsenic detected in

the sample collected from test pit TP1 was present at a concentration which was three times the

screening level. Therefore, contaminant concentrations exceeding applicable screening levels are

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present in all of the soil samples collected from the test pits within the landfill, indicating that the soil

within these areas of the landfill has been adversely impacted by past practices.

Four groundwater samples, including one duplicate sample, were collected from three of the four

monitoring wells installed. The fourth well, MW1, did not contain water and was therefore not

sampled. Arsenic, lead, and manganese concentrations exceeding only the EPA PRGs were detected in

the groundwater samples collected from wells MW2 and MW4. In addition, a tetrachloroethene

concentration exceeding both the EPA PRG and the EPA MCL was detected in the sample collected

from well MW3. This indicates that the materials disposed within the landfill boundaries have

adversely impacted the shallow groundwater beneath the landfill in a localized area. However, this

groundwater appears to be laterally discontinuous. No groundwater seeps were identified during the

seep survey performed onsite and there are no groundwater supply wells present on Bradford Island.

Three samples of building materials thought to potentially contain asbestos were collected from the

waste materials present in two of the eight test pits, TP1 and TP8. Two of these three samples

contained asbestos. The black roofing paper collected from test pit TP1 contained 45 percent chrysotile

fibers and the cement-asbestos board collected from test pit TP8 contained 22 percent chrysotile fibers.

Given that these building materials are buried, they do not currently pose a threat to human health.

However, the presence of these materials would become a consideration during any removal action

proposed onsite. Measures would need to be taken to ensure that these materials do not become friable

and release fibers during removal.

5.4 COLUMBIA RIVER

Two areas of concern with regard to sediment quality were identified adjacent to and on the banks of

the Columbia River east and north of the Bradford Island landfill site. These areas were reportedly

used for storage and disposal of various waste products. However, multiple attempts to collect

sediment in each of these areas met with no success. The attempted sampling locations spanned from

near shore to almost mid-channel. Due to the composition of riverbed materials, when the sampler was

retrieved it was either empty or contained only cobble-size materials. These results, along with the

proximity of Bonneville Dam and the fact that the dam spillway had been open prior to these sampling

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attempts indicate that the area surrounding the island is a scour zone. The dam spillway is opened

yearly from mid-April through late-August on a 24-hour a day basis to facilitate juvenile fish passage

(Johnson, J., 3 November, 1998, personal communication). In addition, the spillway is opened during

flood events when the river flow rate exceeds 280,000 cubic feet per minute.

A visual survey of the island for the presence of groundwater seeps was also conducted on 2 September

1998 from a boat using binoculars, to determine if leachate from the former landfill was migrating to

the Columbia River via groundwater seeps. The sloped banks of Bradford Island, from the change in

slope near the locked gate on the north to the southeastern corner of the island, were carefully

examined for any signs of seepage. No groundwater seeps were identified during this survey.

5.5 CONCLUSIONS AND RECOMMENDATIONS

Of the four areas of concern identified at the Bradford Island landfill site, the greatest potential risk to

human health and the environment is posed by the waste materials and associated soil contamination

present within the landfill. The soil in the discrete disposal areas contains elevated concentrations of

TPH, in addition to concentrations of pesticides, the PCB Aroclor 1260, tetrachloroethene, SVOCs,

arsenic, and lead that exceed their associated risk-based screening levels.

However, additional information is necessary to evaluate the impacts of past waste handling and

disposal practices at the landfill site, and to allow an effective evaluation of remedial alternatives.

Therefore, Tetra Tech recommends that the following additional investigation activities be performed at

the landfill site:

Conduct a geophysical survey of the landfill site and the Columbia River immediately

adjacent to the east end of the island, to better define areas of waste disposal.

Perform quarterly groundwater level monitoring of the monitoring wells and

piezometers installed onsite, at a minimum, and collect at least one additional set of

groundwater samples from the monitoring wells following seasonal occurrence of

TETRA TECH: FINAL SITE INSPECTION REPORT BRADFORD ISLAND LANDFILL, CASCADE LOCKS, OREGON DACW57-96-D0009/TASK ORDER 0010

PAGE 71

sustained, higher precipitation (i.e., early spring), to characterize the affect of seasonal

groundwater fluctuations on contaminant concentrations, and the groundwater gradient.

Perform at least one additional seep survey during annual periods of high precipitation,

to determine if the shallow groundwater at the landfill site is entering the Columbia

River via seepage and overland flow. Given the schedule of water releases over the

spillway of the dam, early April would be the latest that this survey could be

completed.

Collect samples of the IDWs generated during the site inspection to determine the

disposal options available for these wastes. These samples should be analyzed for the

presence of Resource Conservation and Recovery Act (RCRA) metals using the toxicity

characteristic leaching procedure (TCLP) to determine if these IDWs are listed haz-

ardous wastes under the RCRA regulations. In addition, the IDWs should be analyzed

for the constituents required for characterization by the disposal facility selected.

Conduct a geotechnical evaluation of the landfill site to determine slope stability and

erosion potential.

Collect additional soil samples in the pesticide mixing area to determine if this area has

been adversely impacted by past material handling practices.

Collect surface soil samples in the pesticide mixing and landfill site to evaluate potential

risks to human and environmental receptors.

Find and properly abandon the piezometer identified as DH 2002Z reportedly buried

within the landfill to comply with the requirements of OAR Chapter 690, Division 240.

The information obtained by conducting these additional activities can then be used to conduct an

ecological risk assessment, and to evaluate the feasibility and cost effectiveness of a comprehensive

range of remedial options, including, but not limited to, no action, capping, removal actions, limited

removal actions with capping, onsite treatment technologies, or in-situ treatment technologies.

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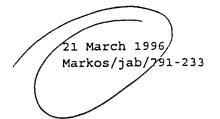
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#### APPENDIX A

## PERSONNEL INTERVIEWS AND AERIAL PHOTOGRAPH REVIEW

CENPP-CO-B

MEMORANDUM FOR Chief, CENPP-CO



SUBJECT: Bonneville Lock and Dam, Suspected Dump Site, Bradford Island.

- 1. We believe there are a number of areas containing hazardous constituents located at the northeast section of Bradford Island. This supposition is based on interviews and site visits conducted by the Project Environmental Compliance Coordinator with five Corps employees familiar with past work practices, one of whom worked at the Project from 1948 to 1983. All five individuals advised past work practices had included the disposal of Project waste at particular areas of northeast Bradford Island. There are also two additional areas at Bradford Island suspected to contain hazardous constituents.
- 2. Requirements: 40 CFR 300.405 and OAR 340-122.
- 3. Based on these interviews, we believe dumping occurred on the northeast section Bradford Island for approximately forty (40) years and ceased in the early 1980s. As sites were filled, others were created and it is unknown how long disposal occurred at each site. The persons interviewed gave similar descriptions of disposal locations and their possible contents. The attached map shows the suspected disposal areas and their contents. The following are wastes believed to be located at the Bradford Island Site.
  - a. Site 1: General household garbage pit. General household garbage was disposed in this pit and was burned monthly.
  - b. Site 2a, b, c, d: Trash Pits. The pits were excavated with a back hoe. Dimensions are believed to be approximately 10x10x10 and were filled with mercury vapor lamps, oil and grease from turbines, grease from wicket and spill gates, and paint-related waste including solvents.
  - c. Site 3: Grease from spillway gate wheels. Grease was stored in five (5) gallon buckets and discarded along the Columbia river bank. It is not known how many buckets were discarded.
  - d. Site 4: Pesticides. This area was used for mixing pesticides. It was also used to rinse articles containing pesticides.
  - e. Site 5: Switch gear and various cables dumped over the Columbia river bank.
  - f. Site 6: (Additional area) This area contains abrasive blast grit which was used as fill material. The grit is suspected to be contaminated with lead paint. In addition, soil analysis conducted in December 1995 indicated levels of petroleum requiring remediation.

- g. Site 7: (Additional area) This area has been used to store scrap metal. Sections of the site are stained with oil. Some of the metal hardware included pipes with lead paint, pneumatic and hydraulic equipment and insulators which possibly held residual PCB oil.
- 4. Based on the hazardous substance disposal history, we propose to conduct an environmental investigation of these sites beginning fiscal year 1998. This will begin with the development of a site characterization plan to assess media contamination including soil and water.
- 5. Should you have further questions on the status of this matter, please contact me at (541) 374-8442.

WADE L. STAMPE

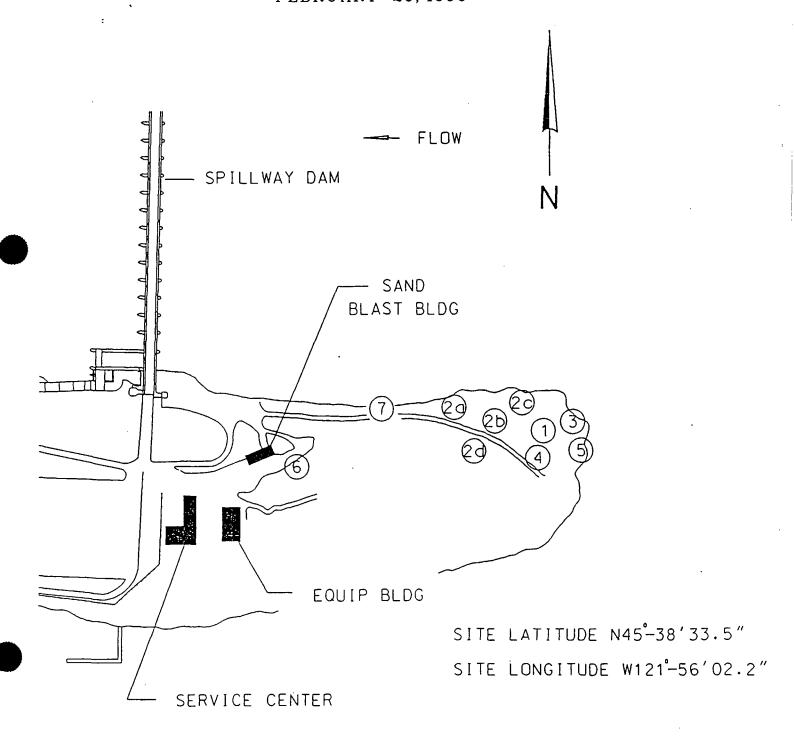
Operations Project Manager

# BONNEVILLE LOCK AND DAM HISTORICAL DISPOSAL SITE

CASCADE LOCKS, OREGON

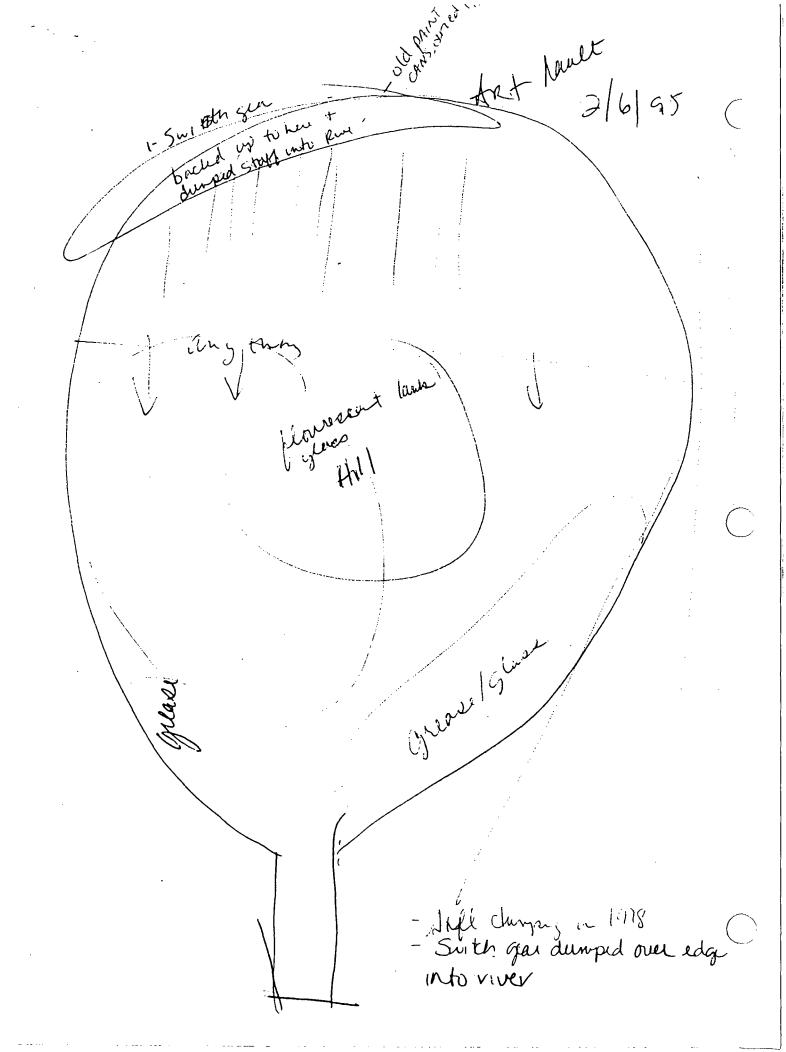
NORTHEAST SECTION OF BRADFORD ISLAND

FEBRUARY 26, 1996



Master of all wherever Steve C. 2/6/95 - Trast/garbage - burned weekly - glass pits, great + oil from Airbine xits, possibly solvents pesticide residue

Stopped dumps in pits in 1986 Dump closed in early 19701 Sept 19, 1995 30 yrs of dump. Close - about 20 or so nouse Pit = Made of word buec steel dump , noto river Singly thousand winds by Dump puned of much wash rack and pipe-Heo washed of tanks > Pants 13 AN MOW

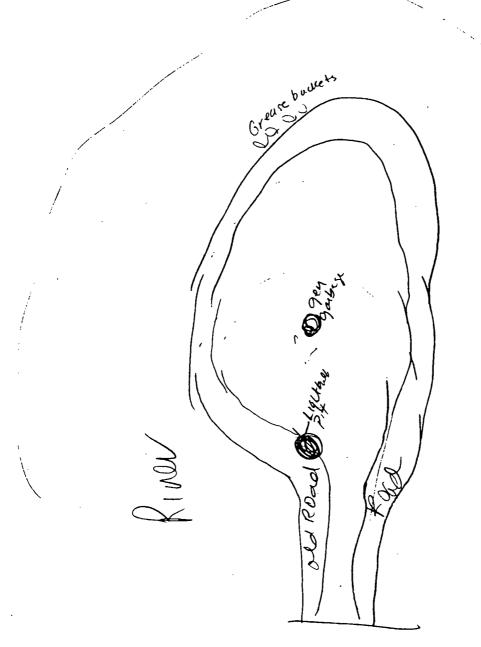


Andy DeBriae Sept 19, 1995 Den up on the pured 17 yrs in South Bonnewille

Light bulb Pit- That toor Mercuy the Varpor
Basic house hold garbage - from South Bonnen le

to 5 9al drums grease from 5pill way gate wheels

+ Stacked along here combe 1980s-thrown over bouch



#### Bolton, Jane M NWP

From:

Markos, Carolyn S NWP

Sent:

Wednesday, April 08, 1998 1:09 PM

To:

Bolton, Jane M NWP

Cc:

Chenoweth, Deborah L NWP; Shank, David C NWP; McCavitt, Brian M

**NWP** 

Subject:

Boat Survey - Bradford Island

Jane,

This is a response to your inquiry about the results of a pool survey I conducted on 9 October 1996. The purpose of the survey was to make a general visual assessment of potential contamination and/or migration of contaminants from North East Bradford Island. The Bonneville forebay was dropped to approximately 72 feet for this boat survey. Along the shoreline of both the north and east facing sections of Bradford Island, I observed numerous cables (possibly switch gear cables). I did not observe any sheen's along the shoreline, nor any staining of soils or rock-faces along the entire northeast section of Bradford Island.

I hope this answers your questions.

Carolyn Markos 808-5406

Year	Photo No.	Description
1936		Dam is under construction. Upstream end of Bradford Island is wooded and untouched
		by construction. Site of landfill appears to have irregular surface and less vegetation than
•	•	other forested areas, but does not appear to be in use.
1942	1-M-16-42	Dam is in partial operation and still under construction. A road along the north shore is
		constructed to the northeast tip. The road leads to an anchor for a log boom upstream of
		the spillway. The site of the landfill is mostly cleared and leveled. Topography of site is
	ļ	fairly low along north shore with a plateau at east end and west end of clearing. A few
	·	piles of material seen near the water on north shore and at extreme southeastern edge of
		clearing. Footpath through wooded area visible from landfill area to construction work
		area. House with boat dock and two slips on southeast edge of island.
1952	52-138	Area of landfill is heavily used. Road is well established and appears to be on the same
9 Aug		alignment as present. The area is evenly graded, showing evidence of filling. It appears
		that truck end dump rubbish along north shore near east end. Piles of rubbish clearly
		present ringing the east end of the clearing, mostly concentrated at north edge. West end
		of clearing along the road apparently used for equipment and structural material storage.
	1	Visible along the road are steel frame structures, six upright cylindrical tank-like
	}	structures ( about 2000 gal), stacked raw structural steel or wood. The water tower on the
		island as been constructed. The boat dock has been removed.
1954	54-818	Evidence of additional filling at east end of site. It appears material is dumped and then
24 Apr		graded and covered, pushing material to the north. There is fresh fill at the north edge of
	}	the area A steep slope is appearing at the north edge of the fill. There is an
		approximately 20 foot wide bench at the original ground level at the shore. Much of the
		material stored on site in the 1952 photography appears in the same location. The house
10.50		appears abandoned and damaged.
1958	58-952	A north to south line of fill and debris bisects the site (may be a central burn pile). Dark
30 Aug	]	staining from liquid is at the south edge of the site and toward east side. A garage and
		shed have been erected at the east end of the site. The northeast edges of the site are now
		used for storage of materials and equipment. Between 80 and 100 drums are stored
		together within 30 feet of the east edge of the site. Materials previously observed are still
	}	stored at the west side of the site. The road has changed from a south access to an area for backing and off-loading to a loop.
1959	59-2025	Area appears to be converted to storage rather than disposal except for the "burn pile"
30 Sep	39-2023	area. Materials stored around north and east edges of the area. Two vehicles on site. No
эо эср	<u> </u>	drums visible.
1967	67-1240	More disposal apparent along northeast to southwest tending area in center of site,
8 Aug	07-1240	appears to have created an upper terrace to the east. The terraced area is larger than in
07145		1959, giving the impression that filling toward the west has occurred through the center
		of the site. More equipment/material stored at east and northeast edges of site. No drums
		visible.
1968	68-2207	Rubbish clearly visible in west face of terrace. May be up to 10 feet high. Continued use
17 Oct	33 223 /	of areas along north and east edges to store materials. Approximately 50 drums north in
		north central area.
1970	70-1356	Use of site well established. East edge near garage and shed regularly used. Northeast
17 Aug	10.000	edge of site for materials storage. Continued dumping expands terrace toward the west.
		Lower west side used for material storage. Apparent staining on ground in north central
		area near where drums were in the 1968 photo. No drums visible.
1971	71-778	Rubbish in face of terrace clearly visible. Material stored at northeast corner appears to
2 Jan		be lumber. Material still stored on lower west side includes the circular structures seen in
		1952 photo. Approximately 40 drums stored together in the same north central area.
1973	73-1780	Additional rubbish in face of terrace appears long and narrow like scrap steel or lumber.

5 Aug		Soil staining around four drums stored on cover material at south edge of terrace face.
		Possible crib as mentioned in 21 Mar 96 memo on lower terrace. Upper terrace storage
		area full. Garage demolished. Less than ten drums in different areas on site. Ground
		appears stained in north central drum storage area.
1978	78-1472	Face of landfill terrace appears covered. 30 drums stored at east end of site Material
7 May		stored at east end, north side and west side. What appears to be a tanker trailer stored in
	İ	center of site.
1979	79-205	Dumping along face of terrace at both ends appears active. About 30 drums at east end of
4 Apr		site. Material storage and movement changes, but storage areas remain the same. The
· -		tanker trailer is no longer on site
1980	80-545	Site appears similar to 1979 photography. Drum storage and face of landfill look the
9 Mar		same. Equipment storage similar.
1981	81-827	No additional dumping apparent. Numerous drums at east end of site. Soil staining at
26 May		drum storage area.
1982	82-763	Appears to be fresh cover material over the face of the west terraced landfill. Equipment
7 Jun		storage unchanged. About 50 drums stored at east end. Where drums removed, staining
		beneath.

#### APPENDIX B

### **CORPS OF ENGINEERS DRILLING LOGS**

HOLE NUMBI	er: D	2001Z P8 1 of 1	FEATURE:	BONNEVILL	E NEW NAVI	GATION I	
TOP ELEVATION TOTAL DEPTHO	H: 97 €	ROCK DRILLED:	COORDINATES: N 723,08/ E /, 632,7 INCLINATION FROM HORIZ: Vertical BEARING:				
EL DEPTH EF	NG. U.S.C.S.	DESCRIPTION		LAB ANI	FIELD DATA		
1-0-	GP-GM	SLITY SANDY GRAVEL W/BONLDERS, brown, v. stiff					
F	://	SILTY GRAVELLY SAND, brown, moist, y. dawsa. APL, 4 inch may., micheous. SILTY GRAVELLY SAND W/ORANIC MTL.	<u>{</u>				
10-		BROWN, damp, NP, MICACCOUS.	}				
80 }		SILTY SAND w/ROCK FRAGMENTS, brown, damp, APL (NP 12°-13°17) Clayslove and basall rock tangments.	]				
20-	5/1	Clayslove and basalt rock tangments. SILTY GRAVELLY SAND, baows, dam, APL.				•	
	3/1	SILTY SAND W/ROCK FRAGMENTS, CD Tec				•	
30		SILTY GRAVELLY SAND WIROCK FRAGS., BROWNIGREY, MOSE, ATL, MICACCOUS					
R	SIN	SILTY GRAVELLY SAND, become, damp, BPL, compact to dense, mica ceous,	-				
40	-22	10% Cabbles, 20% GRAVE 1s 35% Same, 35% Fine	y.				
		SILTY SAND, based, damp, NP, micaccous SILTY GRAVELLY SAND, based, NP, micaccous					
	0m	SILTY SANDY GRAYEL beauty most AT, 207. Finas		1			
50	SM	SILTY GRAVELLY SAND, GROWN, CD Tec stide block, wel NP to APL.					
	GM	ROLK FRAGMENTS W/SILTY GRAVELLY SWID, Toc R.M.					
60	MH	SANDY SILT, brown, damp, BP1, 107. R.FY	1				
		SILTY GRAVELLY SANDE SANDY SILT, gray. SILTY SANDY GRAVEL, brown, wat,					
70-	GM	APL, 50% GRAVEL 30% SAND, 20% Fines			1		
		SILTSTONE, GARY, PD, Tec , dans. SANDSTONE, brown, dans, PD. Tec SILTSTONE & CONSLOMERATE wienheds					
80		CONGLOMERATE, brown, frost to PD					
S	В	SILTSTONE, SANDSTONE, CONGLOM-					
90-		PD, soll to v. soll, Tec					
-47 100			<del></del>				
		Date Completed					
4 4		1 Sapt. 76					
		76 Inac : cal 11:00 1.00		1			

. The second contract of the second contract

101	ELEV AL DE DRILI	PTH:	114 €	ROCK DRILLED:	BEAR	NATIC			.595 RIZ: Ve	entical .	1,633		<del>*</del>	
EL.	DEPTH	ENG. UNIT	CLASS. AND WEATH.	DESCRIPTION	COMP STR	CORE RECV.	ROD			F WEAKNESS	DWR	eim psl	PIEZ	DRILL AND CSG.
37 <u>-</u>	20 30	Fill	SM SP SM	SILTY SAND, brown, wet (oily), APL, yeary soft, contains occasional gravel and rusted metal fragments  SAND and SILTY SAND, with completely decomposed Tec stide blocks, gray, damp, soft  SANDSTONE, fresh to stained state, it grey to medium gray, damp, soft to medium gray, damp, soft to mediand			0 100	p- s0 20		50 at 70 at 50°	. 100	6)		7.75° Dia Bit Vaicon 2.75° Dia Bit (Fire)
77 - 59 <u>-</u> 59 <u>-</u>	50	58cs (Tec)		contains seams of completely decomposed Rock surrounding fresh clasts.  SILTSTONE, whinterbedded sandstone, fresh to stained, dark grey to brownish grey, damp, mod. hand, DQ, MASSITE.  CONGLOMERATE, fresh elasts in a stained to completely decomposed sity and matrix firm mild milds to SM, grey known to grey, some NP, most APL, soft, 60% clasts.  VOLCANIC MUDFLON, grey, 70% Angular clasts										2.5° Dia. Bit (Fing) Y'ESO Z-58'
	90	5B (Tex)		CONGLOMERATE, Majority fresh to stained, med. hand, DO, grey to green grey, matrix silt to fine sand, clasts compose 35-407 of rock, clasts are hand to med had most clasts are PO ignaous rock										25° Din. Bil (Fine)
-/	110-		/	Date Completed 7 Sept. 76 1"-1" Daill Log: Sopi. 16 1"-10" Summay Log: Nov 89		:								2.5" Din. Bil (Gam

.

TO		ATION	140	1 2005Z pg 1 of 1	CON	RDINA	TES- N	723,387 E	1,63	3.045	7	_
701	AL DE	PTH:	136	3 (SD 458) ROCK DRILLED:	INCL	INATIO	N FR	OM HORIZ: Ventical	. ,,			
	. DRILI		CLASS.		HARD	ING:		PLANES OF WEAKNESS	DWR	wpī cim p		D
1	DEPTH	חאת	WEATH.	DESCRIPTION	STR (PLT)	MECV.	ROD	Angle with Respect to Core	Care. , ,	Pel (h)		ć
740			A4 //	GRAVELLY SANDY SILT, brown,		0 100	0 100	0" 10 20 30 40 50 60 70 80 90"	0 10	0		4
		SD	MH	day to days, NP grading to APL, 1070 arms 40% FM sand, 50% 5022					-	P	7	2
1	10-			BOULDER, gary, fresh, hand	1					200	9	-
1245	↓ -		MH	GRAVELLY SANDY SILT (AS Above)	50					450	0.4	
┥	20			CONGLOMERATE, brown, days, CD matrix,	ZQ	\			1	201	55/11	
1.				SANDSTONE, fresh to stawed, brown to grey, CO to DO, soft to mod. hand, 15-70 gravel clasts. COAL seams.	26						N.	
1/31	30-	ļ		CONGLOMERATE, PD mateix,	Ť							
	$\mathbf{p}_{i}$			brown, matrix MH SANdy Silt,	S	ل						
				60% clasts up to 14 ft. HARd	So CQ							2
1	40			MARNEL CLASTS RECOVERED - MOST IN							•   2	I B
١,	]			deill water.		٦			Ì		: ^	_
922	50-			SANDSTONE SO le hor took le staire	Dα		ļ					
	4			SANDSTONE, PD, some DO cones, famble, dest gay, NP 5: 22y sand		4	1			:		
	, 1	SB,		w/s/070 Augulan Acek fangments to 6"	41	اٰل				!		
	•	Tec)	9	PD Silty Sand Mateix, gray, CO/DO, soft. >10% Augulan	20		}					
	4			Rock insquents to 4"	S.							
698	70=				<u>S.</u>	7	]					
	4	•		CONGLOMERATE, PD mateix,		7	{			[•]		
	80-	1		rainble, soft, CO/DO, gao, MH and MI fines occasionally present in decomposed		┥!						
i	1	ı		MAZRIX of SILTY SAND, CLASTS			l			-	•	
	90-			make up = 50 to 60% of Aock.	<u>50</u> CQ				1			
1 1	$\sim$	:		MATRIX WASHES AWAY EASILY— CAVING IS TREQUENT AFTER CORE GARAGE IS	2							
	7			with dearn.		П	İ					
	100			-		H				<u>.</u>	•	
334	4								-			
33 3/°	10			SANDSTONE PD, friable, soft, DO.	<del>20</del>		ŀ		İ	·.	4	~
	-			SILTSTONE, PD. famble, DQ, It gary CONGLOMERATE, PD mataix, 60% clasts	DQ	ᅱ	Ì					
22	20			SILTSTONE, TD. fainble, seft, DO CONGLOMERATE, PD MAZRIX, fainble-	$\dashv$	귀	İ	11111111		•		
168	]			so 12 matrix, 50-60% clasts 20 8.5"			]					
				SANDSTONE, PD, frinkle, soft DO gray, fine to medium grained,	<u>5•</u>							
+ 4ª	30			5-1070 gaavel clasts.	50	1				الم الم	٠	
+41	1			CONGLOMERATE, PD, Soft malais, 601. acres!		1-			$\dashv$	Can	-	_
' <i> </i>	10			Date Completed	1							
	4			27 Sapt 76								
	1	1		NOTE: Dailling motheds prom								
	1		,	to have caused come decomposition and tome losses. Clasts lodged in								
	]			daill bit ground up proply			] ;					
-	1			corrented sodimentary rock. The		- {						
	7			same rock types stand noarly vertical in nearby rock cuts.			1	{				
	7			DRILL Rods vibrated ofter, drill								
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				and come banned withdrawn.								
ı		3	- 1	1".1" Deilliag: Sapt 76	1	1	11		, i	1	1	

**APPENDIX C** 

**PHOTO LOG** 





3. Collection of background surface soil sample BK-1, looking south.

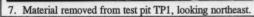




4. Collection of soil sample PW1-SS-01, downgradient of the pesticide mixing area looking southwest.









8. Test pit TP3 after completion (bedrock at 2 feet BLS), looking southeast.



10. Material removed from a depth of 3 feet BLS in test pit TP5, looking east.

9. Material collected from test pit TP5 for sample TP5-SS-01, looking east-northeast.



11. Material removed from test pit TP5 including two mercury vapor lamps, looking south-southwest.



12. Test pit TP8 at the completion depth of 4 feet BLS, looking northwest.





15. Monitoring well MW3 with straw covering backfilled test pit TP4, looking east.



16. Monitoring well MW4 with straw covering backfilled test pit TP5, looking northeast.

#### **APPENDIX D**

#### LAND SURVEY RESULTS

#### MONITOR WELL LOCATIONS-EAST END OF BRADFORD ISLAND

STATE PLANE COORDINATES

Pt.No.	North	Eost	Elevation Desc.
2	723635.61272	1633039.96993	111.66191 H&T
3	723574.24116	1633217.02376	111.47465 H&T
5	723646.69608	1631784.01302	98.11720 PK
6	723682.38824	1631821.77243	97.11290 PK = 1
. 8	723399.34666	1633136.59809	142.35397 H&T
*25	723776.67130	1630600.16890	63.76700 C-P.K. NAIL FND.
*112	723734.66340	1630910.45670	63.87000 PK NAIL
+500	723919.64232	1631796.02880	99.15000 P-16 BRASS DISK
+501	723859.65045	1631793.69785	99.14544 P-17 BRASS DISK
+502	723799.76995	1631791.34175	99.09893 P-18 BRASS DISK
+503	723734.81237	1631788.78710	99.70297 S.M.3+95 BRASS DISK
2000	723653.79896	1632933.90466	105.49575 MW1 TOP PVC N SIDE
2001	723654.08187	1632934.22551	102.84073 TOP CONC. MW1 L17206
2002	723646.42877	1632974.97014	104.23357 TP-2SS01
2003	723635.41423	1633034.77609	111.36431 TP-7SS01
2004	723632. <del>4</del> 0677	1633059.31738	112.75729 TP-1SS01
2005	723564.81346	1633051.27278	116.56051 MW2 TOP PVC N SIDE
2006	723564.72884	1633051.65839	114.20999 TOP CONC. MW2L17207
2007	723574.52769	1633101.41070	114.48267 TP-8SS01
2008	723555.29462	1633042.23052	113.60666 PW-1
2009	723573.75078	1632966.06683	110.62786 BK-1
2010	723650.30394	1633121.33990	113.02780 TP-5SS01
2011	723649.42188	1633138.73490	114.78816 MW4 TOP PVC N SIDE
2012	723649.76332	1633138.71465	114.47193 TOP CONC. MW4L17209
2013	723605.04448	1633139.10071	112.98416 TP-6SS02
2014	723609.88200	1633162.73113	112.72224 TP-6SS01
2015	723626.80463	1633185.94206	113.00497 TP-4SS01
2016	723633.76446	1633220.54484	115.21456 MW3 TOP PVC N. SIDE
2017	723634.20677	1633220.52260	112.99039 TOP CONC. MW3 L17208
2018	723395.95102	1633145.10170	142.87120 BK-2
2019	723427.23827	1633076.67334	146.22694 BK-3
2020	723519.22424	1630650.44352	64.19347 H-380 cv9 BRASS DISK ELEV. PROVIDED BY C.O.E. 65.99

\*BASE COORDINATES AND ELEVATIONS PROVIDED BY HOR. NAD '27 ORE. NORTH (=/- 0.5FT.) SCOTT KOOL - CORPS OF ENGINEERS (503) 808-4849 VERT NGVD '29 +ELEVATIONS GIVEN FROM TETRA TECH, INC. - CARLOTTA CELLUCCI (206) 624-2692

#### LEGEND

MONITORING WELL

HUB AND TACK

TEST PIT

BACKGROUND POINT

NOTES:
ELEVATIONS AND HORIZONTAL LOCATIONS ARE BASED ON 2 CONTROL P.K. NAILS (PT. NO.'S 25 AND 112) LOCATED NORTH OF POWER HOUSE 1, AND EAST OF THE BRIDGE OVER THE FISH LADDER. DATA PROVIDED BY CORPS OF ENGINEERS.
ELEVATIONS WERE CONFIRMED ON BRASS CAPS LOCATED ON THE SPILLWAY, AS SHOWN ON THE ABOVE MAP.
MONITORING WELLS WERE LOCATED FOR POSITION AND ELEVATION AT THE TOP OF THE CONCRETE CASING AROUND EACH WELL PIPE, AND AT THE TOP OF THE PVC PIPE EXTENDING OUT OF THE CASING. STEEL PIPE CASING POSITIONS WERE NOT DETERMINED.



C.O.E. PORTLAND CONTRACT DACW 57-96-D-0009

MONITORING WELL LOCATION SURVEY FOR TETRA TECH, INC. BONNEVILLE DAM - BRADFORD ISLAND CASCADE LOCKS, OREGON

SHEET

08/31/98	1" = 100'
DRAWN BY:	FILE NO:
D. T.B.	98087WK.DWG

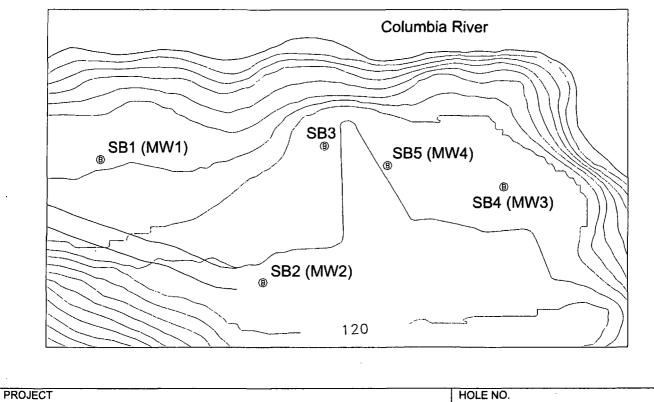
KENT W. COX AND ASSOCIATES, INC. CONSULTING ENGINEERS - LAND SURVEYORS 204 NORTHEAST KELLY AVENUE GRESHAM, OREGON 97030 (503) 667-4464 ENGINEERING PLANNING SURVEYING LAND DEVELOPMENT

#### **APPENDIX E**

#### **FIELD BORING LOGS**

HTRW DRILLI	r P	HOLE NUMBER SB1									
1 COMPANY NAME			2 DRILL S	UBCONTR	ACTOR	₹		SHEE	T SHEET		
Tetra Tech, Inc.			Cascade [	Drilling			1	OF 3			
3 PROJECT			4 LOCAT								
USCOE Bradford Isla	nd Landfill			I	Bradfe	ord Island Landf	ill				
5 NAME OF DRILLER			-	6 MANUF	ACTU	RERS DESIGNAT	ION OF DR	ILL			
Steve Hughes					CME	75					
7 SIZES AND TYPES OF DRILLIN	IG AND SAMPI	LING EQ	UIPMENT	8 HOLE L	OCATI	ON					
1						end of landfill					
4.25" ID (9.25 OD) HS						53.80 North)					
18" long, 2" OD split s		r				933.91 East)					
140 lbs with 30-inch of	Irop			9 SURFACE ELEVATION							
İ				102.84' (TOC = 105.50')							
				10 DATE STARTED 11 DATE COMPLETED							
				8/17/98 8/17/98							
12 OVERBURDEN THICKNESS				15 DEPTH GROUNDWATER ENCOUNTERED							
28'				No Groundwater							
13 DEPTH DRILLED INTO ROCK				16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING							
2' (fractured)				COMPLETED  No groundwater after >24 hours							
14 TOTAL DEPTH OF HOLE				No groundwater after >24 hours  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)							
30'				_	K WAI		UKEWEN I	3 (SPE	⊃IF 1 <i>)</i>		
18 GEOTECHNICAL SAMPLES	DISTURB	ED	UNDIS	TURBED 19 TOTAL NUMBER OF CORE BOXES							
0	voc 1			0	<u>L</u>	<u> </u>					
20 SAMPLES FOR CHEMICAL ANALYSIS	LS/SVOCs	OTHE		OTHER	OTHE		21 TOTAL CORE				
VIAVETAIS	7		7	(SPECIFY)		(SPECIFY) (SPECI Chlor herbs - 1 TPH		, ,	RECOVERY		
	ĺ				'	Cilioi Heibs - I	1 12.11	•			
22 DISPOSITION OF HOLE	BACKFILLED		ITORING	OTHER (	SPECIF	Y) 23 SIGNAT	JRE OF INSE	ECTOR			
Well installed	VELL			( /			$-\!$				
			X	<u> </u>			-				

#### LOCATION SKETCH/COMMENTS:



Bradford Island ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

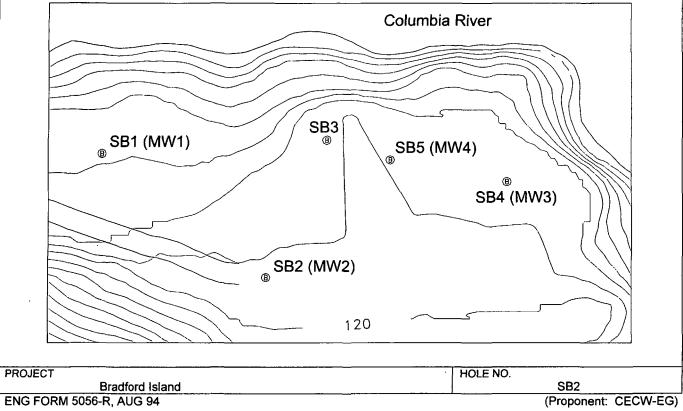
HTF	RW DR	ILLING LOG (CONTINUA	TION SHEET	<del></del> -			HOLE NUMBER SB1	
PROJEC			INSPECTOR	arlotta Cellu	ucci		SHEET SHEETS 2 OF 3	1
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO.	BLOW COUNT (g)	REMARKS (h)	1
	1 —	Grassy cover underlain by brown sandy silt with gravel (ML) (sand 10%, gravel 30%, fines 60%) loose, dry			:		Background PID reading = 2.8	0
	2 —							2
	4 —							4
	5	No recovery				40 50	No recovery at 5' drilled to 6' BLS	5
	7 —	No recovery (1" slough)  Dark brown clayey silt (ML) with	2.7			31 64 72 13	About 1" of slough in sampler at 6' BLS 2' of recovery in	<u> </u>
CL.	8 —	gravel, moist, firm (gravel 5%, fines 95%) grading, to silty clay (CL) at approximately 7.5' BLS, low plasticity (95% fines, 5% gravel)	<u>-</u>			13 17	2.5' sampler at 7' BLS	8
	9	Same as above with areas of	3.1		!	7	1.25' of recovery	9
<b>C</b>	" =	orange oxidation in spots grading to gray sitty clay (CL) with gravel at approximately 11' BLS (95% fines, 5% gravel)	3.1			7 7	Background PID = 3.1	= "
	12						Very hard at 13'	12
	14 —						BLS	14
	15 —	No recovery				86 120	No recovery	15
	16						Very hard at 16' BLS	16
SM		Gray silty clayey sand (SM), dry/moist, well graded, (45% fines, 55% sand) possible ash flow	2.7			28 41 60	1.25' recovery	
PROJEC	CT Bradford I DRM 5056A-					HOLD NO	SB1 ponent: CECW-EG	

İ

		ILLING LOG (CONTINUA		<u> </u>	<u> </u>		SB1	4	
PROJEC	CT Bradford I	Island	INSPECTOR	arlotta Cellu	ıcci		3 OF 3	Ί.	
	DEPTH	DESCRIPTION OF	FIELD	GEOTECH	ANALYTICAL	BLOW		-	
ELEV (a)	(FEET)	MATERIALS (c)	SCREENING RESULTS (d)	SAMPLE OR CORE BOX NO (e)	SAMPLE NO.	COUNT (g)	REMARKS (h)		
	18			,,,					18
	1 =	<del>]</del>							
	19 —								19
	=							$\vdash$	-
	20	Gray gravelty, clayey silt (ML) (20%	2.3	ļ	8/17/98-	28	PID background =		20
		gravel, 80% fines) low plasticity,			BIL-SB1-	46	2.3: 2' Recovery in		
, MILI	21	very stiff			SS01 (1200)	60	1st sampler		21
1.144411111	=		2.7		(1200)	19 46	3" of Recovery; 2nd sampler at 20'; PID		
[[] []]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]	_ =		}	1		70	background 2.0	三	22
	22 —	Same with increasing clay content	2.0			25	4th sampler		22
		(20% gravel, 80% fines) grading at 22.5' to gray silty gravelly clay (CL),			[	48 56	hammered at 22'		
	23 —	low plasticity, moist, very stiff	1.6			28	Full recovery		23
		(5% gravel, 95% fines)				45 60	5th sampler hammered at 22.5'		
	24					&	BLS		24
			1		]	]	1.5' Recovery	$\vdash$	
	25				Į		Background PID = 1.6		25
	25								23
			Į						
	26								26
			ļ	ļ			1	<u> </u>	
	27	S	4.0			25	4 25' Dansun	<u> </u>	27
		Same as above to contact at approximately 28' with weathered	1.6			25 46	1.25' Recovery		
	28	rock/sand stone/ash tuff, well		i					28
Ash tuff		graded angular macrocrystalline (100% sand/crushed rock)	1					<u></u>	
		(100,000,000,000,000,000,000,000,000,000							
Ì	29 —		j		i				29
i		Drilled to 29.5' BLS						=	
1	30		}		}				30
-									
	31							<u> </u>	31
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	, <del> </del>								35
	35								30
	=			ŀ				$\vdash$	
DDC 15				L	L	HOLD NO		<del> </del>	
PROJE	C1 Bradford Is	sland				HOLD N	SB1	1	
NG FO	RM 5056A-4					(Pro	ponent: CECW-EG	รี	

HTRW DRILLI	NG LO	3	DISTRICT		ortland	ч			HOLE NUMBER SB2		₹
1 COMPANY NAME			2 DRILL S	UBCONTR					SHEE		ETS
Tetra Tech, Inc.				Cascade [					1		3
3 PROJECT			1	4 LOCATION							
USCOE Bradford Isla	nd Landfill				Bradfo	ord Is	land Lan	dfill			
5 NAME OF DRILLER				6 MANUFACTURERS DESIGNATION OF DRILL							
Steve Hughes				<u>l</u>	CME :	75					
7 SIZES AND TYPES OF DRILLIN	IG AND SAMPI	LING EQ	UIPMENT	8 HOLE L	OCATI	ON					
				1			ash area	1			
4.25" ID (9.25 OD) HS				(723564.81 North)							
	18" long, 2" OD split spoon sampler						27 East)				
140 lbs with 30-inch drop				9 SURFA							
	·				114.21' (TOC = 116.56')						
				10 DATE STARTED 11 DATE COMPLETED							
10.01/500110051171101/				8/17/98 8/17/98							
12 OVERBURDEN THICKNESS				15 DEPTH GROUNDWATER ENCOUNTERED							
30'				No Groundwater Encountered/Dry Hole							
13 DEPTH DRILLED INTO ROCK				16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED						G	
~2' (weathered)				32.32 below TOC after 24 hours							
14 TOTAL DEPTH OF HOLE		-						SUREMENT		IFY)	
32'				17 011121			- V L   VIL	ioonement.	O (OI EC	,	
18 GEOTECHNICAL SAMPLES	DISTURB	ED	UNDIST	URBED	19 T	OTAL	NUMBER	OF CORE B	OXES		
0	~		-	-		(	)				
20 SAMPLES FOR CHEMICAL	VOC	META	LS/SVOCs	OTHER			THER	OTHER	1 -	1 TOTAL	
ANALYSIS				(SPECIF	Y)	(SP	ECIFY)	(SPECIFY	)	RECOVE	ERY
22 DISPOSITION OF HOLE	22 DISPOSITION OF HOLE BACKFILLED MONITORING WELL				SPECIF	Y)	23 SIGNA	TURE OF INSP	PECTOR		
X											
LOCATION SKETCH/COMMENTS				L							

#### LOCATION SKETCH/COMMENTS:

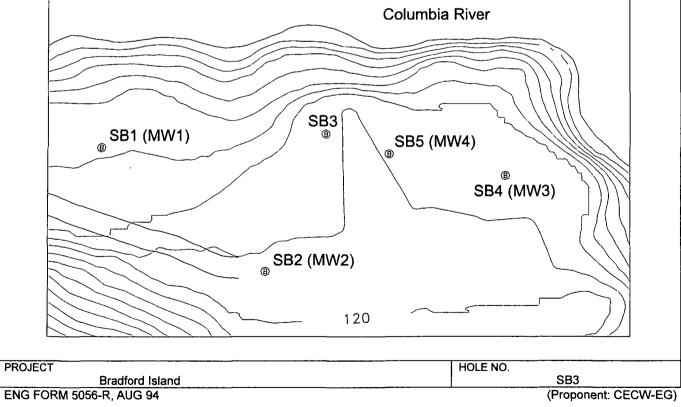


HTR'	W DR	ILLING LOG (CONTINUA	TION SHEET)	ı			HOLE NUMBER SB2	1
ROJECT	Bradford I	sland	INSPECTOR				SHEET SHEETS 2 OF 3	1
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (9)	REMARKS (h)	
	3	Very dark gray clayey sand (SM) with gravel, well graded, moist (20% fines, 15% gravel, 65% sand), loose-firm.  Contact at 6.5' BLS with brown	0.2	ROY NO (6)		28 48 56	Background PID reading = 2.0  Background PID dropped to 0.0 2' of recovery	
Weather- ed Bassit	8	sandy sitty clay with gravel, (CL) (25% sand, 65% fines, 5% gravel) firm, moist, low plasticity  Brown sandy clay matrix with basalt fragments to cobble size, some moisture in fractures and between	0.0			18 26 50	1.5' recovery	
	12	matrix and basalt cobbles. Cobbles are angular to subrounded (10-20% matrix, 80-90% fractured basalt)						
PROJECT	16	Same as above, gray-black fractured basalt in a brown sandy clay matrix. Sand and basalt fragments are angular to subrounded (10-20% matrix, 80-90% fractured basalt)	0.0			23 50	8" recovery	

		ILLING LOG (CONTINUA		<u> </u>		SB2	4	
ROJEC	T Bradford I	sland	INSPECTOR				SHEET SHEETS 3 OF 3	
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)	
	19							
Vesither- ed rock	20	Brown sandy clay with gravel (CL) (10% gravel, 20% sand, 70% fines) low plasticity, moist, firm to contact at approximately 20.5' with desiccated rock (sand with angular	0.0			28 50	1.25' recovery	
	22 —	gravel) (5% gravel, 95% sand) moist, well graded, angular, dense (granite or macrocrystalline volcanic)		! !				
	24	Gray weathered/desiccated sand	0.0			26	1' + 3 " slough	
ļ	26	stone (ash tuff?), very dense, well graded, moist				50		
	28							
	29							
Veather- ed rock	31 —	Red rhyolitic cobble underlain by gray sand/sandstone/ash tuff (weathered) well graded sandstone fragments are angular, very dense, moist	0.0			40 50	1' + 3 " slough recovery	
Vesther- ed rock	32	Gray weathered sandstone/ash tuff, fragmented Total Depth = 32'	0.0			50	6" recovery	
	34	•						
ROJEC						HOLD NO	SB2	

ENG FORM 5056A-4, AUG 94

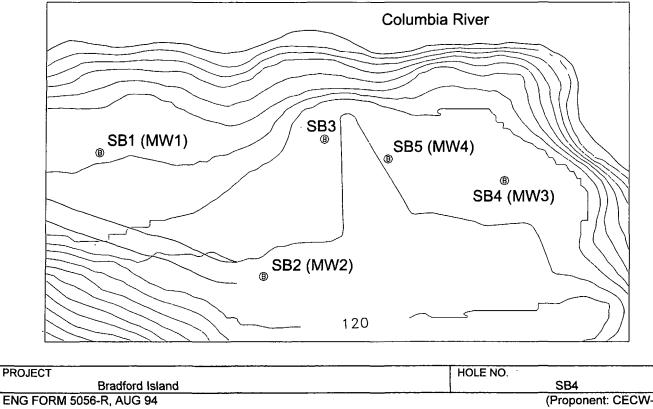
HTRW DRILLI	NG LO	3	DISTRICT		ortland		1	HOLE NUMBER SB3		
1 COMPANY NAME			2 DRILL S	UBCONTRA				SHEET SHEETS		
Tetra Tech, Inc.			1	Cascade D			'	1 OF 2		
3 PROJECT			1	4 LOCATION						
USCOE Bradford Isla	and Landfill					d Island Land	เกแ			
5 NAME OF DRILLER				6 MANUF	ACTURI	RS DESIGNA	TION OF DRIL	_		
Steve Hughes					CME 7	5				
7 SIZES AND TYPES OF DRILLI	NG AND SAMP	LING EC	UIPMENT	8 HOLE LO						
					Central	landfill				
4.25" ID (9.25 OD) H 18" long, 2" OD split		r								
140 lbs with 30-inch		•		9 SURFAC	E ELE	/ATION				
					Not sur					
		10 DATE S	STARTE	D	11 DATE CO	MPLETED				
		8/17/98 8/17/98								
12 OVERBURDEN THICKNESS						NDWATER EN	COUNTERED			
N/A				I	N/A					
13 DEPTH DRILLED INTO ROCK	(			1		TER AND ELA	APSED TIME A	FTER DRILLING		
N/A				COMPI	N/A					
14 TOTAL DEPTH OF HOLE						DIEVEL MEA	SUREMENTS (	SPECIEVI		
7'				1	N/A		CONCINIENTO	(O. CO. 1)		
18 GEOTECHNICAL SAMPLES	DISTURB	ED	UNDIST	TURBED		TAL NUMBER	OF CORE BOX	(ES		
0				-		0				
20 SAMPLES FOR CHEMICAL	voc	META	LS/SVOCs	OTHE		OTHER	OTHER	21 TOTAL CORE		
ANALYSIS .				(SPECIF	Y)	(SPECIFY)	(SPECIFY)	RECOVERY		
22 DISPOSITION OF HOLE	BACKFILLED		ITORING VELL	OTHER (	SPECIFY	23 SIGNA	JURE OF INSPE	CIOR		
	×	,	VLLL							
2217010170170170170										
OCATION SKETCH/COMMENT	S:									
				C	olumb	ia River				
1		_		_						



זור	400 DK	ILLING LOG (CONTINUA	TION SHEET	)		HOLE NUMBER SB3		
ROJEC	T T		INSPECTOR		U		SHEET SHEETS	1
	Bradford I	Sland DESCRIPTION OF	FIELD	arlotta Cel	HUCCI ANALYTICAL	BLOW	2 OF 2	-
(a)	· (FEET)	MATERIALS (c)	SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	SAMPLE NO.	COUNT (g)	REMARKS (h)	
	0	Grassy cover						
	_						:	
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_	5				]			<u></u>
seit _		Fractured basalt to contact at approximately 5.5' with well graded		]	[	12 6		
w	_	fine to very fine grained, moist gray		l	1	4		
	6	sand (SW) (100% sand) dense						
1								厂
}	7 —	Refusal at 7' BLS		ļ				
		Neiusai at 7 DES						
Ì	8			}				<u> </u>
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ROJE	CT.		L	L	<u></u>	HOLD NO		—
,∪1⊏(	Bradford Is	hand	•		•	11000140	SB3	1

HTRW DRILLI	NG LO	3	DISTRICT		ortland			HOLE	NUMI SB4	
1 COMPANY NAME			2 DRILL S	UBCONTR	ACTOR			SHEE	T S	HEETS
Tetra Tech, Inc.				Cascade Drilling 1 OF						3
3 PROJECT				4 LOCATION						
USCOE Bradford Isla	nd Landfill			<u> </u>	Bradford Is	sland Land	ifill			
5 NAME OF DRILLER						S DESIGNA	TION OF DR	ILL		
Steve Hughes					CME 75					
7 SIZES AND TYPES OF DRILLIN	IG AND SAMPI	LING EQ	UIPMENT	8 HOLE L						
					East end of					
4.25" ID (9.25 OD) HS					(723633.7					
18" long, 2" OD split s 140 lbs with 30-inch d		Г			(1633220.	55 east)				
		9 SURFACE ELEVATION								
				ĺ	112.99'	(To	OC = 115.2	2')		
				10 DATE	STARTED		11 DATE (	COMPL	ETED	
				l	8/17/98		_ ;	8/17/98	3	
12 OVERBURDEN THICKNESS N/A					I GROUND Approxima		COUNTERE	D	•	
13 DEPTH DRILLED INTO ROCK				16 DEPTH	TO WATE	R AND ELA	PSED TIME	AFTER	DRIL	LING
Approximately 0.5' (F	ractured)			COMP	LETED					
					17.65		er 20 hours			
14 TOTAL DEPTH OF HOLE						EVEL MEA	SUREMENTS	S (SPE	CIFY)	
21'					N/A					
18 GEOTECHNICAL SAMPLES 0	DISTURB	ED	UNDIST	URBED 	19 TOTAL 	L NUMBER 0	OF CORE B	OXES		
20 SAMPLES FOR CHEMICAL	VOC	META	LS/SVOCs	OTHE		OTHER	OTHER			L CORE
ANALYSIS	1			(SPECII	FY) (S	SPECIFY)	(SPECIFY)		RECO	VERY
22 DISPOSITION OF HOLE	BACKFILLED	MON	ITORING	OTHER (	SPECIFY)	23 SIGNA	FURE OF INSP	ECTOR		
į		v	VELL		•		/			
	X					_				<u> </u>

#### LOCATION SKETCH/COMMENTS:



HTRW DF	RILLING LOG (CONTINUA	TION SHEET				HOLE NUMBER SB4	
PROJECT Bradford	<del></del>	INSPECTOR	 arlotta Cellu	ucci		SHEET SHEETS 2 OF 3	1
ELEV (FEET) (a) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO.	BLOW COUNT (g)	REMARKS (h)	
1 ————————————————————————————————————	Brown sitty sand with gravel (SM) (fines 20%, gravel 5%, sand 75%) very dense, dry, well graded	0.0	BOX NO (6)		50	1' of recovery	
10	Same as above with clay (SM) (fines 40%, gravel 5%, sand 55%) very dense, dry to moist, well graded, appears to be weathered basalt (i.e., clayey matrix with basalt/volcanic sand and gravel)	0.0			50	6" of recovery Material packing augers had to pull augers and clean out material.	
13 ————————————————————————————————————	No recovery				86 120	No recovery. Material packed auger and bit again at 15' BLS had to pull augers and clean out again. Drilled with center rod and plug	
PROJECT	Island	l			HOLD NO	SB4	$\vdash$

		ILLING LOG (CONTINUA		i			HOLE NUMBER SB4	
ROJEC			INSPECTOR				SHEET SH	
	Bradford I			arlotta Cellu	ıcci		3 OF 3	1
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)	
	19						Became wet at approximately 18' BLS	
eather- rock	20	Brown weathered rock in silty sand matrix (fines 5%, sand 25%, gravel/angular rock 70%) wet, very	0.0		8/17/98- BIL-SB4- SS-01	8 50	1' of recovery in 1st sampler	
	21 ————————————————————————————————————	dense, well graded second sampler driven at 20' BLS = Fractured basalt in a sand matrix with large volume of free water			(1805) VOCs only (Not submitted	50	3" of recovery in 2nd sampler	
	23 —	Refusal at 21' BLS (Hard rock)		!	to the laboratory for analysis)			
	24 —							
	25							
	27							
	28 —							
	30							
	31' —			;				
	32 —			;				
	33							
	35						·	
ROJEC	T Bradford Is RM 5056A-4					HOLD NO	SB4	}

•										
HTRW DRILLIN	IG I O	DISTRIC	•				HOLE NUMBER			
1 COMPANY NAME		i i	SUBCONTR	Portland		<del></del>	SB5 SHEET SHEETS			
Tetra Tech, Inc.		2 DRILL	Cascade I			Ι,	1 OF 3			
3 PROJECT			4 LOCAT							
USCOE Bradford Islan	d Landfill		Bradford Island Landfill							
5 NAME OF DRILLER			6 MANUF			ATION OF DRIL				
Steve Hughes	,			CME 7	5					
7 SIZES AND TYPES OF DRILLING	AND SAMP	ING EQUIPMENT	8 HOLE L							
					ast area of la	ndfill				
4.25" ID (9.25 OD) HS/	٩ .				9.42 north)					
18" long, 2" OD split sp		r		(16331	38.74 east)					
140 lbs with 30-inch dr	ор		9 SURFA	OF FLEX	VATION		<del></del>			
			9 SURFA	114.47		OC = 114.79')	1			
			10 DATE			11 DATE CO				
			10 DATE	8/18/98			18/98			
12 OVERBURDEN THICKNESS			15 DEPTI			NCOUNTERED				
approximately 30'			1		n 15-20' BG					
13 DEPTH DRILLED INTO ROCK			16 DEPT	H TO WA	ATER AND EL	APSED TIME A	TER DRILLING			
Decompose <1'			COMP	LETED						
			<del> </del>	17.25		ter 4 hours				
14 TOTAL DEPTH OF HOLE			17 OTHE		R LEVEL MEA	SUREMENTS (	SPECIFY)			
30' 18 GEOTECHNICAL SAMPLES	DISTURB	ED LINDIG	TURBED	N/A	TAL NUMBER	OF CORE BOX	/EC			
0	DISTORE			1910	O O	OF CORE BOX	NES			
20 SAMPLES FOR CHEMICAL	VOC	METALS/SVOCs	OTHE	R	OTHER	OTHER	21 TOTAL CORE			
ANALYSIS			(SPECI	FY)	(SPECIFY)	(SPECIFY)	RECOVERY			
22 DISPOSITION OF HOLE	BACKFILLED	MONITORING	OTHER (	(SPECIFY	') 23 SIGNA	TURE OF INSPE	CTOR			
		WELL X				,				
		,								
LOCATION SKETCH/COMMENTS:										
			C	olumb	oia River					
		///								
				//		7///	\			
				/		\ \\\\\\				
					_5	///////				
		SB:	3		(	z				
SB1 (MW	1)	// 8		SR5	(MW4)					
(B)			\@	000 (	(IVIVV-7)	3///				
			ļ			®	3 111113			
					SB4	l (MW3)	1 ) ) \ \			
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	$\sim$	SR2 (MAN	<b>(2</b> \			\				
		SB2 (MV	v4)							
		~								

120

Bradford Island ENG FORM 5056-R, AUG 94

PROJECT

SB5 (Proponent: CECW-EG)

HOLE NO.

ROJEC1		ILLING LOG (CONTINU	ATION SHEET		SB5 SHEET SHEETS	-		
UJEU	Bradford I	eland	MOFECTOR	arlotta Celli	ucci			
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	2 OF 3  REMARKS (h)	
	0	Grassy cover	<del> </del>	200000				$\vdash$
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				)			}	$\vdash$
333	5 —	Brown silty sand with gravel (SM)	1.1	1	1	11	6" recovery (2" of	
Hillimi		(fines 25%, gravel 5%, sand 70%)	"."		Į	11	which are	
		dry to moist, dense, well graded				20	slough)	
	6 —		1		1		Background PID	
				;	ļ	ļ	<1.1	
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314	10	Mottled black/orange/brown silty	0.4	Ì		5	6" of recovery	
mmilli		sand (SM) with gravel (fines 10%,			j	5	Background PID	
	11	sand 75%, gravel 15%) moist,			į	5	= 0.3	
		dense, well graded					İ	
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l	15	No recovery				3	No recovery	$\vdash$
	$\exists$	Sampler wet	1			6		
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ROJEC			<del></del>	<del> </del>	·	HOLD NO		1
		sland				,	SB5	ı

HTR	RW DR	ILLING LOG (CONTINUA	TION SHEET	)			HOLE NUMBER SB5	
PROJECT			INSPECTOR	adetta Call			SHEET SHEETS	1
ELEV (a)	DEPTH (FEET) (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)	
	19	No recovery				50	No recovery Background PID	19
ď	21	Gray gravelly (fractured volcanics) clay (CL) (fines 60%, fractured rock 40%) very stiff, moist-wet, low plasticity	0.1			10 33 50	= 0.1 2.75' recovery	21
	25	Gray gravelly, clayey sand (SM) (gravel 10%, fines 10%, sand 80%) gravel = angular volcanics, sand is volcanic/angular wet, dense, well graded	1.0			50	5" recovery Background PID = 0.8	25
	28							28
Weather- ed Rock	30	Gray decomposed volcanics in a gravelly clay matrix, moist, very dense, well graded, all gravel and rock is angular	0.3		,	31 50	2' recovery Background PID = 0.3	30
	32	Total Depth = 30'						32
	34 ————————————————————————————————————	NOTE: A large piece of metal was wrapped around the augers when they were removed from the boring.						34
PROJEC	T Bradford I	sland		<u> </u>	<u></u>	HOLD NO	). SB5	
ENG FOR	RM 5056A-					(Propo	nent: CECW-EG	5)

#### **APPENDIX F**

#### **TEST PIT AND FIELD SAMPLING LOGS**



O' 2' 4' SCALE IN FEET		CABLES	
	TP1-SS-01	ROOFING MATERIALS AND PAPE	: <b>R</b>
1P7-55-01 1P7-55-01 1P1-55-01	SILTY	FILL BR. SANDY GRAVEL L. TRASH, MICA OF GLASS, efc. ING MATERIALS PAPER, CABLES	-
9K – 1 MW2 g		L. TRASH, GLASS, CERAMIC ATORS. ANVILS, HOUSEHOLD TRASH	1

		1	Final Test Pit D	imensions (Sq.Ft.)	:13_	_X <u>5</u> _	_X <u>_1</u>	1 deep
Associated Photographs:	1-17 through	1-25						
Grab Sample No.	8-19-98-BIL-TP1-	SS-01						
Time/Date Collected:	0950 / 8/19/98	Depth Collected:	10' BLS	Location:	TP1 S/S	.w		<u></u>
PID Reading:	0.0U	USCS Designation:	GM	Soil Color:	Very Da	rk Brov	/n/Blac	<u>k</u>
Soil Description:	Silty sandy gravel	with trash (fines 10%,	gravel/sand 90	% - matrix of trash	only) we	t,		
	loose-dense, w	vell graded.						
Grab Sample No.								
Time/Date Collected:	·	Depth Collected:		Location:				
PID Reading:		JSCS Designation:		Soil Color:				
Soil Description:		······						
)								
Comments: Also co	Comments: Also collected asbestos samples from material removed from TP1:							
8-20-98-BII	-ASB-01 - roofing	paper - black at 1415	and 8-20-98-BI	L-ASB-02 – silver	roofing c	oating/n	nastic a	t 1418



Test Pit No:	TP1	Test Pit Location: _	North Central Landfill	Page <u>2</u> of <u>3</u>
Temperature: _	60's	Wind Speed: <5 mph	Wind Direction:	Variable
General Weath	er Conditions: Pa	artly cloudy	Log Prepared By: Carlot	ta Cellucci
Soil Description		<del></del>	<del></del>	
	<del></del>	Soil Color: Brown	USCS Designation:	GW
			y, sandy, gravel (fines 10%, sand 20	
	dry-wet, well graded	i, loose-dense with trash from 2' BI	LS as described on page 3 attached.	<del></del>
Depth Range:		Soil Color:	USCS Designation:	
PID Reading: _		Description:		
Depth Range:		Soil Color:	USCS Designation:	
		Description:		
Depth Range:				
Depth Range: _		Soil Color:		
Depth Range: _		Soil Color:	USCS Designation:	
Depth Range: _		Soil Color:	USCS Designation	:
PID Reading: _		Description:		



Feet BLS	Description	PID
2.5	Top of buried trash, mostly household with mica sheets and small books, and lots of glass fragments	(Background @ 3.2)
4	Buried cables and assorted metal	
6	Buried roofing paper and assorted metal	(Background @ 2.5)
8	Abundance of roofing paper	(Background @ 1.0)
10 to 11	Assorted metal, roofing paper, and cloth, SE corner of bucket wet Sample TP1-SS-01 bucket contained broken glass, broken pieces of ceramic insulators, rusted pieces of metal, and household trash (bottle of	Background dropped to 0.0 0.3
	nail polish), metal nails	0.0



Test Pit No: TP2	Test Pit Location:	West Edge of Landfill AGRAM	Page 1 of _	3
O' 4' B' SCALE IN FEET  1P2-SS-01 1P1-SS-01	WEST	SURFACE  EAST  TP2-SS-01  PLAN VIEW  TP2-SS-01  LEGEND  BR. SILTY GRAVELLY SAND  DISCOLORED (BLACK) SOIL AND SOME METAL DEBRIS  WEATHERED FRACTURED BASALT		
	Final Tes	t Pit Dimensions (Sq.Ft.): 31' X 8	' X 2-2.5'	<del></del>

		<del></del>	
	Fina	l Test Pit Dimensions (Sq.Ft.)	: <u>31' X 8' X 2-2.5' deep</u>
Associated Photographs:	Camera damaged, photos lost		
Grab Sample No.	8-19-98-BIL-TP2-SS-01		
Time/Date Collected:	1225 / 8/19/98 Depth Collected:	2' BLS Location:	TP2 East End (25' E of West end)
PID Reading:	0.0 USCS Designation:	SM Soil Co	olor: Dark Brown
Soil Description:	Dark brown silty, gravelly sand (fines 25	5%, gravel 30%, sand 45%) d	ry to moist,
	dense, well graded with glass fragm	ents and small pieces of meta	l/nails.
		•	
Grab Sample No.	·		
Time/Date Collected:	Depth Collected:	Location: _	
	USCS Designation:	· ·	
Soil Description:			
Comments:			



Test Pit No:	TP2	Test Pi	t Location: We	st Edge of Landfill	Page 2	of <u>3</u>
Temperature:	High 60's	Wind Speed:	<5 mph	Wind Direction:	Variable	
General Weather	Conditions:	Partly cloudy to clear		Log Prepared By: <u>Carlotta</u>	Cellucci	
Soil Description						
	0-2.5' BLS	Soil Color:	Brown	USCS Designation:	SM	_
	0.0			relly sand (fines 25%, gravel 30		
	dry, dense, well	graded.				
Depth Range:	>2.5'	Soil Color:	Dark Gray/Black	USCS Designation:		
PID Reading:	0.0	Description:	Weathered, fracti	red basalt, microcrystalline, vo	ery hard	
Denth Pange		Soil Color:		USCS Designation:		
				USCS Designation.		
Depth Range:		Soil Color:		USCS Designation:		
Depth Range:		Soil Color:		USCS Designation:		
	·					·
Depth Range:		Soil Color:		USCS Designation:		
Depth Range:		Soil Color:		USCS Designation:		



Feet BLS	Feet East of Western Edge	Contents	PID
2	Entire Length	Fractured basalt contact. Black, microcrystalline, very hard	0.0
1.5-2.5' contact with basalt	22' (37' from MW1) (West end of TP2 is 15' East of MW1)	Black discolored soil with some metal and cables to basalt contact at 2.5 feet BLS. (Western edge of landfill)	0.0



	TP3	rest Fit Location	East end of Landfill	Page 1 of2_
		<b>EXCAVATION D</b>	<u>IAGRAM</u>	
	SCALE IN FEET  TP5-SS-01  MW4  TP6-SS-02  TP4-SS  TP6-SS-01  MW3	8'	LEGEND  BR. SANDY, GRAVELLY, SILT  WEATHERED / FRACTURED BASALT	
Associated Phot	tographs: 2-1	Final Tes	at Pit Dimensions (Sq.Ft.):31'_X4'	X _ 2' deep
Grab Sample N	No.			
Grab Sample N Time/Date Colle	No. ected:	Depth Collected:	Location:	
Grab Sample N Time/Date Colle PID Reading:	No. ected:	Depth Collected: USCS Designation:	Location:	
Grab Sample N Time/Date Colle PID Reading:	No. ected:	Depth Collected: USCS Designation:	Location:Soil Color:	
Grab Sample N Time/Date Colle PID Reading: Soil Description Grab Sample N	No. ected:	Depth Collected: USCS Designation:	Location: Soil Color:	
Grab Sample N Time/Date Colle PID Reading: Soil Description  Grab Sample N Time/Date Colle	No	Depth Collected: USCS Designation:  Depth Collected:	Location:  Location:  Location:	
Grab Sample N Time/Date Colle PID Reading: Soil Description  Grab Sample N Time/Date Colle PID Reading:	Noected:	Depth Collected: USCS Designation:  Depth Collected: USCS Designation:	Location:  Location:  Location:	



Test Pit No:	TP3	Test Pi	it Location:	East end of Landfill Page 2 of 2	<u>2</u>
Temperature:	70's	Wind Speed: 5 r	mph	Wind Direction: SE	
General Weathe	r Conditions:	Clear, light wind		Log Prepared By: Carlotta Cellucci	
Soil Description	<u>n</u> .			· · <del>- · · ·</del>	
Depth Range: _	0-2' BLS	Soil Color:	Brown	USCS Designation: ML	
PID Reading:	0.0	Description:	Brown sandy	gravelly silt (sand 15%, gravel 25%, fines 60%)	
	dry, dense/firm	m, low plasticity.			
Depth Range:	>2'	Soil Color:	Brown/Black	USCS Designation:	
PID Reading:	0.0	Description:	Weathered ar	nd fractured basalt	<u> </u>
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:					<u> </u>
Depth Range:		Soil Color:		USCS Designation:	<u> </u>
PID Reading:					_
Depth Range:					
PID Reading:	·-				_
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:					
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:					
	<del></del>				



Test Pit No:	TP4	Test Pit Location:EXCAVATION	East end of Landfill  DIAGRAM	Page 1 of2
	O' 4' 8' VERTICAL SCALE  O' 2' 4' HORIZONTAL SCALE	EAST TO THE TOTAL PROPERTY OF THE TOTAL PROP		WEST
		EAST 194-55-	LAN VIEW	WEST
)	TP5-SS-01  TP6-SS-02  TP6-SS-01  TP8-SS-01  MM.		BR. GRAVELLY, SILTY SAN  DK BR. STAINED GRAVELL  WEATHERED FRACTURED 6	Y SILTY SAND
Associated Pho	tographs: <u>N/A</u> No. 8-19-98-BIL		est Pit Dimensions (Sq.Ft.):24	.5' X 4' X 3.7'

Associated Photographs: N/A

Grab Sample No. 8-19-98-BIL-TP4-SS-01

Time/Date Collected: 1525 / 8/19/98 Depth Collected: 3.7' Location: TP4

PID Reading: 0.0 USCS Designation: SM Soil Color: Dark Brown

Soil Description: Dark brown gravelly, silty sand (gravel 30%, fines 15%, sand 55%)

dry-moist, well graded, dense.

Grab Sample No.

Time/Date Collected: Depth Collected: Location: Soil Color: Soil Description: Soil Description: Soil Color: Soil Color: Soil Description: Soil Description: Soil Color: Soil Color: Soil Description: Soil Description: Soil Description: Soil Description: Soil Color: Soil Color: Soil Description: Soil Description: Soil Color: Soil Color: Soil Description: Soil Color:



Test Pit No:	TP4	Test Pi	t Location:	East end of Landfill	Page $\underline{2}$ of $\underline{2}$
Temperature:	70's	Wind Speed:	<5 mph	Wind Direction:	Variable
General Weathe	r Conditions:	Clear, sunny		Log Prepared By: Carlott	a Cellucci
Soil Description	<u> </u>				
Depth Range: _	0-3' BLS	Soil Color:	Brown	USCS Designation:	SM
PID Reading:	0.0	Description:	Brown grave	elly, silty sand (gravel 30%, fines 1	5%, sand 55%)
·	dry, well grade	ed, dense.			
Depth Range:	>3'	Soil Color:	Dark Gray/E	Black USCS Designation:	
PID Reading:	0.0	Description:	Weathered,	fractured basalt	
Denth Range:		Soil Color:		USCS Designation:	
Depth Range:		Soil Color:		USCS Designation:	
Depth Range:	<del></del>	Soil Color:		USCS Designation:	
Depth Range:		Soil Color:		USCS Designation:	
Depth Range:		Soil Color:		USCS Designation:	



Comments: \_

## Test Pit Log Site Inspection Former Bradford Island Landfill Site Cascade Locks, Oregon TC-10022-03

Test Pit No:	TP5	<del></del> -	Test Pit Location:	North Central I	Landfill	Page 1 of3
			<b>EXCAVATION D</b>	<u>IAGRAM</u>		•
	Ō	SCALE IN FEET	. <u>Southwest</u>	178 -55-01 • 179 -55-01	NORTHEAST  LEGEND	ML  TRASH CONSISTING OF TIRES, WOOD, BROKEN GLASS, AND MERCURY VAPOR LAMPS IN ML MATRIX
	TP7-SS-01 TP1-SS-0	P6-SS-02		PLAN VIEW		o Krith .
	PW-1 P8-SS	-01 -055-01 uw.2.				entagen e
Associated Pho	tographs:	2-2 through 2-		et Pit Dimensions (S	6q.Ft.):	X 4' X 5' deep
Grab Sample I			-SS-01 / 8-20-98-BIL-TP	0-88-01	·	
Time/Date Coll		0855 / 8/20/98	Depth Collected:		ion: TP5	
			USCS Designation:			k
<b>-</b>			ly, gravelly, silt (sand 10%		· · · · · · · · · · · · · · · · · · ·	
			y.			
Grab Sample N		mm, low plasticity	<u> </u>		<del></del>	
~ ~minpre !		•	Depth Collected:	I.ocati	ion:	
Time/Date Coll	ectea.					
Time/Date Coll PID Reading:			USCS Designation:			

Collected TP5-SS-01 in duplicate; TP9-SS-01 as Blind duplicate from this test pit (0955)



2 of <u>3</u>
:
<u>'</u>
, fines 65%)
oily. Types
_
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<del></del> ,



Feet BLS	Contents	PID
2.5	Beginning of trash – tire (discolored-black soil matrix)	0.0
3.0	Wood cover underlain by lots of broken glass then more tires	0.0
5	Broken glass, mercury vapor lamps	0.0



Comments: \_\_\_\_\_

#### Test Pit Log Site Inspection Former Bradford Island Landfill Site Cascade Locks, Oregon TC-10022-03

Test Pit No: TP6	1	est Pit Location:	East end of	f Landfill	Page 1 of2
		<b>EXCAVATION D</b>	<u> LAGRAM</u>		
	SCALE IN FETT  SCALE IN FETT  FPS-SS-01  MM4  TP6-SS-02  TP8-SS-01  MM3	TP6-SS-01	LEGEND	TPB-SS-02  ML  GM  ML WITH STAINING ANI	D CHARCOAL
		Final Test Pi	t Dimensions (S	ML WITH SOME STAINING METAL DEBRIS, AND POSSIBLE PAINT RESID	X 4' X 1.5'-6.5' deep
Associated Photograph	as: 2-10 through 2-12 a		i Dimensions (o	4.1 t.)	_AA
	8-20-98-BIL-TP6-SS-01	_			
	1050 / 8/20/98 D		4' L	ocation:	17' west of east end TP6
	0.0 USCS		<del></del>		
Soil Description:	·		•		6, fines 55%)
	moist, firm, well graded		,		
Grab Sample No.	· · · · ·				
Time/Date Collected:	1140 / 8/20/98 D	epth Collected:	6.5' L	ocation:	40' west of east end of TP6
PID Reading:		Designation:			Brown/Dark Brown
Soil Description:	<del></del>	· -		•	
<u></u>	moist, firm, low plastici		·	_	

East end of TP6 is 46 feet west of monitoring well MW3



Test Pit No:	<u>TP6</u>	Test P	it Location: _	East end of Landfill	Page <u>2</u> of <u>2</u>
Temperature: _	70's	Wind Speed:	5 mph	Wind Direction:	South
General Weather	er Conditions:	Partly cloudy, sunny	<del></del>	Log Prepared By: <u>Carlot</u>	ta Cellucci
Soil Description	<u> </u>				
Depth Range: _	0-1' BLS	Soil Color:	Brown	USCS Designation:	ML
PID Reading: _	0.0	Description:	Brown san	dy, gravelly, silt (sand 31%, gravel)	25%, fines 65%),
	dry, firm,	low plasticity.			
—— Depth Range:	1-2'	Soil Color:	Brown	USCS Designation:	GM
	0.0		<del></del>	y sandy gravel (fines 10%, sand 10%	•
		w plasticity.			
Depth Range: _	2-6.5'	Soil Color:	Dark Brow	m-Brown USCS Designation:	ML
PID Reading:	0.0	Description:	Dark Brow	m-Brown sandy gravelly silt (sand 2	0%,
<del></del>	gravel/cobbles	15%, fines 65%) moist, firm	n, low plastic	ity with mica flakes, staining, with r	metal debris
	and possible pa	aint residue 40' west of east	end of TP6.		
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:		Description:	<del></del> .		<del></del>
Denth Range	·	Soil Color:		USCS Designation:	
				CSCS Designation.	
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:		Description:			
Depth Range:		Soil Color:		USCS Designation:	
PID Reading:	<del></del>	Description:			
<del></del>	· · · · · · · · · · · · · · · · · · ·				



Test Pit Location: Central Landfill \_\_\_\_ Page 1 of \_\_\_\_2\_ Test Pit No: \_\_\_\_\_\_ TP7 \_\_\_\_\_ **EXCAVATION DIAGRAM** CAUTION TAPE LEGEND TP2-SS-01 TRASH CONSISTING OF WOOD DEBRIS, INSULATION, CHARCOAL, PLASTIC, RUBBER HOSES Final Test Pit Dimensions (Sq.Ft.): 9' X 4' X 7' deep Associated Photographs: 3-4 through 3-6 8-20-98-BIL-TP7-SS-01 <u>Grab Sample No.</u> Time/Date Collected: 1350 / 8/20/98 Depth Collected: 4.5 Location: Central Landfill PID Reading: \_\_\_\_ 0.0 USCS Designation: SW Soil Color: Gray Soil Description: Gray, fine grained, well graded sand (100%), moist, dense. Grab Sample No. Time/Date Collected: \_\_\_\_\_ Depth Collected: \_\_\_\_ Location: \_\_\_\_

PID Reading: \_\_\_\_\_ USCS Designation: \_\_\_\_ Soil Color: \_\_\_\_

Soil Description:

Comments: \_\_\_\_\_



Test Pit No:TP7	Test Pit Location:	Central Landfill	Page <u>2</u> of <u>2</u>
Temperature: 70's	Wind Speed: <5 mph	Wind Direction: SE	
General Weather Conditions: Pa	artly cloudy	Log Prepared By:Carlotta Cell	ucci
Soil Description			
		USCS Designation:	
	<u> </u>	ty, gravelly, sand (fines 15%, gravel 25	·
dry, well graded	l, dense.		
			a
Depth Range: 4'- 7' (total depth)		USCS Designation:	
PID Reading: 0.0	Description: Gray sand	l, well graded, moist, dense, mixed wit	h debris from 5-7' BLS
Depth Range:	Soil Color:	USCS Designation:	
PID Reading:			
Depth Range:	Soil Color:	USCS Designation:	
PID Reading:			
Depth Range:	Soil Color:	USCS Designation:	
PID Reading:			
Depth Range:	Soil Color:	USCS Designation:	
PID Reading:	<del></del>	OSCO Designation.	
Depth Range:			
PID Reading:	Description:		



Test Pit No:	TP8	Test Pit Location:	South Central Landfill	Page 1 of _	2
lest Pit No:	1178	lest Pit Location:	South Central Landill	rage I of _	

# SCALE IN FEET MORTHWEST SOUTHEAST PPS-55-01 PPS-55-01 PPS-55-01 PPS-55-01 PPS-55-01 WM3 SW SW PPS-55-01 SW SW SW WITH URLED WASTE BECURES OF ELL HIRESTEL B

		Final	Test Pit Di	mensions (Sq.Ft.)	: <u>15' X 4' X 4' deep</u>
Associated Photographs:	3-7 through 3-	9		<del></del>	
Grab Sample No.	8-20-98-BIL-TP8-5	SS-01			
Time/Date Collected:	1450 / 8/20/98	Depth Collected:	4'	_ Location:	South Central Landfill
PID Reading:	0.0 L	JSCS Designation:	SM	Soil Co	olor: Brown-Dark Brown
Soil Description:	Brown-Dark Brown	n silty, gravelly, sand (	fines 10%,	gravel 30%, sand	60%)
	moist, dense, well	graded.	· · · · · · · · · · · · · · · · · · ·		
Grab Sample No.					
Time/Date Collected:		Depth Collected: _		_ Location: _	
PID Reading:	ŭ	JSCS Designation:		Soil Co	olor:
Soil Description:	·				
Comments:	Also collected asbe	estos sample: 8-20-98-	ASB-03 -	Dark gray transite	collected at 1500.



Test Pit No:	TP8	Test Pit Location:	South Central Landfill	Page <u>2</u> _ of <u>2</u> _
Temperature: _	70's	Wind Speed: <5 mph	Wind Direction:	SE
General Weather	er Conditions:	Partly cloudy	Log Prepared By: Carlott	a Cellucci
Soil Description	<u> </u>		_	
Depth Range: _	0-1' BLS	Soil Color: Brown	USCS Designat	ion:SM
PID Reading: _	0.0	Description: Brown silty	gravelly, sand (fines 10%, gra	vel 25-30%, sand 60-65%)
	dry, well grad	ed, dense.		
Depth Range: _	1-2' BLS	Soil Color: Gray	USCS Designat	on: SW
PID Reading: _	0.0	Description: Gray sand (	100%), well graded, dry-moist,	dense.
Depth Range:	2 4' BI S	Sail Calar: Brown Day	k Brown LISCS Designat	ion: SM
PID Reading:			k Brown USCS Designat k Brown stained silty, gravelly,	
. 12		avel/cobbles 25-30%, sand 60-65%), mois	_	
		l debris and pipes, glass and bottles, and to		
	•			***
Depth Range:		Soil Color:	USCS Designati	on:
PID Reading:		Description:		
Depth Range:		Soil Color:	USCS Designat	on:
PID Reading:				
Depth Range:		Soil Color:	USCS Designati	on:
PID Reading:				
Depth Range:		Soil Color:	USCS Designati	on:
PID Reading:		•		
	·		<del></del>	
<u> </u>		·		



					Page101
Temperature: Uppe	<u>r 70's</u>	Wind Speed:	N/A	Wind Direction:	Variable
General Weather Cond	tions: Partly c	loudy/sunny		Log Prepared By: Paul B	ean/Carlotta Cellucci
				-	
		SAMPLES (		<del>-</del>	
				Time Collected: _	
				Sample Depth Interval:	
				Soil Color:	
				(cobbles 20%, sand 65%),	
<del></del>	very wet, loose,	well graded.		·	
Associated Photographs	: Roll 1, photo	o 11 and 12 - sampling	at BK1 back	ground metals sample.	
		· · · · · · · · · · · · · · · · · · ·			
Comments:					
				<u> </u>	
Samuel NI 0 10 4	00 BH BH2 60 01	D . C !! !	0.10.00	T' G.V.	1000
		_		Time Collected: _	
				Sample Depth Interval:	
				Soil Color:	
Soil Description:	Brown, silty, gra	velly sand (fines 10%.	gravel 30%	, sand 60%)	·
	well graded, dry	dense, with some roo	ots.		
Associated Photographs	: Roll 1, photo	) 13 – BK3 sample loc	ation.		
Comments:					
ample No: 8-18-9	8-BIL-BK2-SS-01	_ Date Collected: _	8-18-98	Time Collected:	1310
-		_ Date Collected: _		Time Collected: Sample Depth Interval:	
ample Location:	BK2	_		Sample Depth Interval:	6-7" BLS
ample Location:	BK2 0.0	USCS Designation:	ML	Sample Depth Interval:	6-7" BLS Brown
ample Location:	BK2  0.0  Brown, sandy, gr	USCS Designation: _	ML gravel 40%,	Sample Depth Interval: Soil Color:	6-7" BLS Brown
Sample Location: PID Reading: Soil Description:	BK2  0.0  Brown, sandy, graded, well graded,	USCS Designation: _ ravelly silt (sand 10%, very dense, with root	ML gravel 40%,	Sample Depth Interval: Soil Color: fines 50%),	6-7" BLS Brown
Sample Location: PID Reading: Soil Description:	BK2  0.0  Brown, sandy, graded, well graded, Roll 1, photo	USCS Designation: _ ravelly silt (sand 10%, very dense, with root 14 - sample collection	ML gravel 40%, ss.	Sample Depth Interval:Soil Color:fines 50%),	6-7" BLS Brown



Temperature:	60	Wind Speed:	0-5 mph	Wind Direction	Page <u>2</u> 01 <u>2</u> n: Variable
-			·	Log Prepared By:	
		SAN	MPLES COLLE		·
Sample No: 8-	19-98-BIL-I	•		19-98 Time Collecte	ed: <u>0810</u>
Sample Location:	Adja	cent to pesticide mixing p	oad	Sample Depth Inter	val: 1' BLS
		und) USCS Desig			Brown
Soil Description:	Brow	n, gravelly, silty, sand (	gravel/cobbles 2:	5%, fines 25%, sand 50%),	
	dry to	o moist, dense, well grad	ed with some ro	ots and organics.	
Associated Photogra	aphs:	1-16 - sample collection a	at PW1 – sample	location.	
Comments:					
Sample No:		Date Co	ollected:	Time Collect	ed:
Sample Location: _				Sample Depth Interval:	-
PID Reading:		USCS Desig	nation:	Soil Color:	
Soil Description:					
Associated Photogra	nphs:			-	
Comments:					
Sample No:			llastadi	Time Collected:	
•		Date Co			
PID Reading:			nation:		
Associated Photogra	aphs:				
Comments:					

#### **APPENDIX G**

GROUNDWATER WELL CONSTRUCTION, DEVELOPMENT, AND SAMPLING LOGS



#### **Above-ground Monitoring Well Construction Log**

Project Name: LISCOE BRADFORD ISLAND Well No.: MWOI (581) Date: 8/17/98

Project No: \_\_\_\_\_OC22-O5 Drilling Method: \_\_\_\_HSA

Geologist: Carlotta Cellucci

—— c ——		
M D	A: Total Boring Depth:	<u>30'</u>
	B: Boring Diameter:	9.25"
To	C: Diameter of Protective Casing:	5" lD
	D: Length of Protective Casing:	5'
	Type of Protective Casing:	Steel mountment
	E: Interval of Surface Grout:	0-4'
	F: Total Riser Casing Length:	31.4'
	Length of Sediment Sump:	ļu
	Casing Type:	Sch. 80, Flush threaded PVC
A	G: Inner Diameter:	1.62" (2" 00)
F B B B B B B B B B B B B B B B B B B B	H: Depth to Screen:	20'
	I: Screen Length:	10'
	Screen Intrval:	20'-30'
	Screen / Slot Type:	O.O1O'' Factory slot
	J: Depth to Top of Seal:	<u>4'</u>
	K: Thickness of Seal:	15'
	Type of seal material:	Pure add medium Bentanite chips
	L: Depth to Top of Filter Pack:	17'
	Type of Filter Pack:	20/40 Colorado silica sand
——B——	M: Top of Casing Elevation:	105.50' above msl
. <del>-</del>	N: Surface Elevation:	102,84' above msl

NOTE: Well was not surged after placement of sand pack, because there was no water in the well.



## Above-ground Monitoring Well Construction Log

Project Name: USCOE BRADFORD ISLAND Well No.: MWO2 (582) Date: 8/17/98

Project No: 10022-05 Drilling Method: H5A

Geologist: <u>Carlotta Cellucci</u>

	<del></del> (	· —	-	
		7	<u>M</u>	DN
	200000	2016-2018	+c	
			]	
	500000000			_
A   F			K	
	——В			

NOTE: Well was not surged after placement of sand pack, because there was no water in the well at that time. Well was surged by hand prior to well development. A: Total Boring Depth:

B: Boring Diameter:

9,25"

C: Diameter of Protective Casing:

5"10

D: Length of Protective Casing: Type of Protective Casing:

\_\_\_\_\_\_5

E: Interval of Surface Grout:

0-4'

Steel maintment

F: Total Riser Casing Length: Length of Sediment Sump:

Casing Type:

34.14' '''

1.62" (2" 00)

G: Inner Diameter:

Sch. 80, Flush threaded PVC

H: Depth to Screen:

22'

10'

I: Screen Length:

Screen Intrval: Screen / Slot Type: 22'-32' 0.010'' Factory slot

J: Depth to Top of Seal:

Δ1

K: Thickness of Seal:

Type of seal material:

Pure add medium Bentanite chips

L: Depth to Top of Filter Pack: Type of Filter Pack:

20/40 Colorado silica sand

M: Top of Casing Elevation:

116.56' above ms

N: Surface Elevation:

114.21' above msl

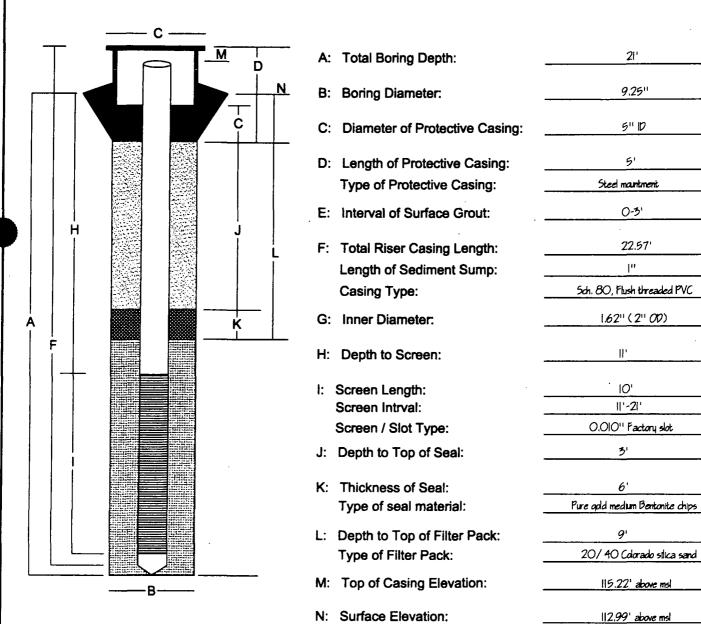


### Above-ground Monitoring Well Construction Log

 Project Name:
 USCOE BRADFORD ISLAND
 Well No.:
 MW05 (584)
 Date:
 8/17/98

 Project No:
 10022-05
 Drilling Method:
 H5A

Geologist: Carlotta Callucci



NOTE: After placement of sand pack, surged well for 5 minutes, Sand settled 4-inches. Replaced sand and surged again for 5 more minutes; sand did not settle.



### **Above-ground Monitoring Well Construction Log**

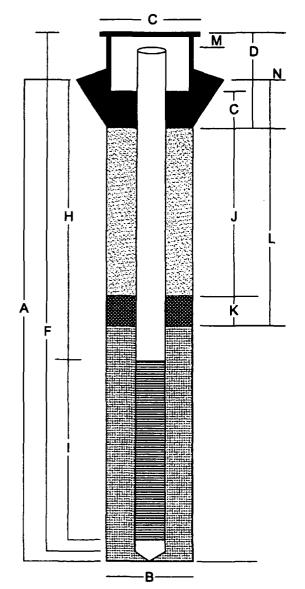
Project Name: USCOE BRADFORD ISLAND

Well No.: MWO4 (585) Date: 8/18/98

Project No: \_\_\_\_\_ 10022-05

Drilling Method: H5A \_\_\_\_\_

Geologist: Carlotta Callucci



NOTE: After placement of sand pack, surged well for 5 minutes, Sand settled I' inch. Replaced sand and surged again for 5 more minutes; sand did not settle.

Δ	Total	Boring	Denth:

B: Boring Diameter:

**6**11

C: Diameter of Protective Casing:D: Length of Protective Casing:

5' Steel manntment

**5**0'

Type of Protective Casing:

0-41

E: Interval of Surface Grout:

31.85'

F: Total Riser Casing Length:

Length of Sediment Sump:

Casing Type:

5ch. 80, Flush threaded PVC

G: Inner Diameter:

1.62" (2" 00)

H: Depth to Screen:

10'

I: Screen Length:

Screen Intrval: Screen / Slot Type: 10'-30' 0.010" Factory slot

J: Depth to Top of Seal:

4'\_\_\_\_

K: Thickness of Seal:

Type of seal material:

Pure gold medium Bentanite chips

L: Depth to Top of Filter Pack: Type of Filter Pack:

20/40 Colorado silica sand

M: Top of Casing Elevation:

114.79' above msl

N: Surface Elevation:

114.47' above msl



# Well Development Log

Site Inspection
Former Bradford Island Landfill Site
Cascade Locks, Oregon
TC-10022-03

Monitoring Well No.: MW - 2		Development D	Page / of / Pate: 5 - 19 - 98
Development personnel:	Bun	Total Developm	nent Time: 2 hrs.
Weather Conditions:	ppy 77's		·
, , ,	EVACUATIO	N DATA	
Measuring Point: TEC		Casing Diameter:	2"
Total Depth of Well: 34/15	<u> </u>	Total Gallons Purged for	r Development:
Static Water Level: 29.10		Color: H	-1
Height of Water Column: 5,05		Odor:	ne
Gallons per Foot: 0.16	<u></u>	Appearance:	ady
One Casing Volume: 0.80	<del></del>		
Evacuation Method/Equipment:	posable bu	a for	:
		REMENT EVENTS	: -
Number of Casing Volumes	Gallons Purged		Turbidity
		_	7200
2 Puryed dry of	- 2	_	7200
3	3	_	189.9
<u></u>	ij	_	190.8
Forged day of	5	_	190.0
	6	_	1910
Turged dry	7	_	191.1
at 7.5 gallons	-8	_ `	191.1
		_	
		<del>-</del>	
	**************************************	_	
	Well Casing Voh	umes	
GAL/FT 1.25° = 0.077 1.5° = 0.10	2" = 0.16 4" = 0.65	2.5° = 0.24 6° = 1.46	3" = 0.37 3.5" = 0.50



GAL/FT

# Well Development Log Site Inspection Former Bradford Island Landfill Site Cascade Locks, Oregon TC-10022-03

Monitoring Well No.:		Develop	Page / of 2.  oment Date: 2-/9-98
Development personnel: Paul	Begon	Total D	evelopment Time: 3 hrs.
Weather Conditions: 54114	UPP 70'S		
<b>,</b> , , , , , , , , , , , , , , , , , ,	EVACUATION 1	DATA	
Measuring Point:	c	asing Diameter	: 2"
Total Depth of Well: 22.5	7т	otal Gallons Pu	arged for Development: 65
Static Water Level: 176	<del>7</del>	olor:	+an
Height of Water Column: 4. 90	<u>2</u> o	dor:	None
Gallons per Foot: 0./6	<u> </u>	ppearance:	Cloudy
One Casing Volume: 080	<del></del> .		<i>y</i> 
Evacuation Method/Equipment:	sperable bailer		
PAF	RAMETER MEASURE	MENT EVENT	rs
Number of Casing Volumes	Gallons Purged		Turbidity
<u> </u>			>200
			7200
3			7200
<u> </u>	<u> </u>		7200
5			7200
<u> </u>	20		7208
25	2-5		7200
<u> </u>	<u> 30</u>		7200
35	35		1925
40	40		192.3
45	45		>200
	Well Casing Volumes	:	

2° = 0.16 4° = 0.65

1.5° = 0.10

2.5° = 0.24 6° = 1.46

3.5" = 0.50



# Well Development Log Site Inspection Former Bradford Island Landfill Site Cascade Locks, Oregon TC-10022-03

	•	Page Z of Z
Monitoring Well No.:	-3	Development Date:
Development personnel:	<del></del>	Total Development Time:
Weather Conditions:	· · · · · · · · · · · · · · · · · · ·	
	EVACUATION DATA	
Measuring Point:	Casing 1	Diameter:
Total Depth of Well:	Total G	allons Purged for Development:
Static Water Level:	Color:	
Height of Water Column:	Odor:	
Gallons per Foot:	Appeara	nnce:
One Casing Volume:		
Evacuation Method/Equipment:		
P	ARAMETER MEASUREMENT	EVENTS
Number of Casing Volumes	Gallons Purged	Turbidity
<u>50</u>	_50	7200
_53	_55	7200
6C	<u> 60</u>	196.5
<u> </u>	6/	188.2
62	_6Z	1883
<u>63</u>	_63	178.1
<u>6</u>	60/	188.6
65	<u>(;)</u>	188.3
<del></del>		
	Well Casing Volumes	



# Well Development Log Site Inspection Former Bradford Island Landfill Site Cascade Locks, Oregon TC-10022-03

Monitoring Well No.:		Develop	Page <u>/</u> of <u>/</u> ment Date: <u>8 - 20 9 5</u>
Development personnel:	Poul Beaut	_ Total De	velopment Time: 4/h15
Weather Conditions:	Partly Cloudy; lan	J 70's	·
	EVACUATIO	N DATA	
Measuring Point:	TOC	Casing Diameter:	2"
Total Depth of Well:	31.82	Total Gallons Pur	ged for Development: 46
Static Water Level:	17.25	Color:	brunish
Height of Water Column:	1457	Odor:	Nine
Gallons per Foot:	B.16	Appearance:	cloudy
One Casing Volume:	2.33		
Evacuation Method/Equip	pment: <u>Aisposoble b</u>	ulor	
	PARAMETER MEASUR	EMENT EVENT	S
Number of Casing Volum	des Gallons Purged		Turbidity
	2.5	_	>200
	5.0	_	7200
3	7.5	_	7200
4 Purged	dry at 10.0	_	>200
6	4:11005 	_	7200
	ident 20.0	_	7200
14 # WI	9 Man S 1 upradetly 36.0	_	82.6
15.4 Forg	1 repealetly 36.0 is dry ippost 4 gallins 35.5	_	86.5
16.4	41.0	_ ·	86.3
174	43.5	_	86.1
19.4	46.0	_	85,9

GAL/FT

3.5" = 0.50



#### Groundwater Sampling Log Site Inspection

#### Former Bradford Island Landfill Site

Cascade Locks, Oregon TC-10022-03

090298-BI Sample No.:Mw2-5w-		on: <u>MW - Z</u>	Sa	mpling Date:	Page <u>/</u> of <u>/</u> 9-2-98
Sampling personnel:	Osgood, P. Be	an Siterale	<u>∕Sçi</u> ∕ Sa	mpling Time:	0745
Weather Conditions:					
	•	ACUATION DAT			
Measuring Point:	TOC	Heig	tht Above/Below	Reference Surf	ace:
Total Depth of Well:	34.48	Refe	rence Surface:		TOC
Static Water Level:	10.82	Phot	oionization Dete	ector Reading:	4.8
Height of Water Column:	23.66	Thic	kness of Floatin	g Product:	rone
Gallons per Foot:	0.16	Casii	ng Diameter:		2"
One Casing Volume:	3.78		ons Purged prior		212
Evacuation Method/Equip	oment: Dis Jusa	ble baile	· ·		
	GROUNDW	ATER QUALI	TY DATA		
Color: Night bas	74 Odor:	ne	Ap	pearance: Si	lightly loudy
, ,	PARAMETER	MEASUREME		C	roung.
<u>Initial</u>	<u>No. 1</u>	No. 2	<u>No. 3</u>	<u>No. 4</u>	<u>Sample</u>
Gallons Purged:	4	8	/2	Sumple	
Temperature: $67.2$	63.1	61.6	61.1	59.3	, >
pH: 7.51	8.14	8.46	8.34	8.12	
Conductivity: 117	144	167	163	179	
Salinity:					
Turbidity: 118	<u>//3</u>	411	<u>390</u>	159	
Comments: well programmed 24.4 ft; and	sect dry affects per-3 falfic com any fect w/ books	r 5 gallon ld rut purg	s removed unpop wo	Cwate 1story gellons	ivel at
GAL/PT 1.25° = 0.077	1.5" = 0.10	Well Casing Volumes  2° = 0.16	2.5" = 0.24	3" = 0.37	3.5" = 0.50
	corred to 30.	4-0.65 29 ff Afi	6°=1.46 4~1,5		
wed P	recovery = 6	- ~/2	gallons	· · · · · ·	
Kake at	10cony = 6	1.02 +1/12	es seci		



GAL/FT

1.25\* = 0.077

1.5" - 0.10

# Groundwater Sampling Log Site Inspection Former Bradford Island Landfill Site

#### ormer Bradford Island Landfil Cascade Locks, Oregon TC-10022-03

	Page <u>/</u> of <u>/</u>
Sample No Mw 3- Fw-01 Sample Location: Mu	
Sampling personnel: P. Osgood, P. Ben S.	Herderson Sampling Time: 1900
Weather Conditions: Suna 7, 20° F	
EVACUATIO	ON DATA
Measuring Point: 70C	Height Above/Below Reference Surface:
Total Depth of Well: 22.84	Reference Surface:
Static Water Level: 17.82	Photoionization Detector Reading: 24.0
Height of Water Column: 5.02	Thickness of Floating Product: 101C
Gallons per Foot: D.16	Casing Diameter: 211
One Casing Volume: $O.80$	Gallons Purged prior to Sampling: 3.0
Evacuation Method/Equipment: Ver 5/2//2	Zums
GROUNDWATER (	QUALITY DATA
Color: C/ea/ Odor: NONE	Appearance: Transform
Color: <u>C/ea/</u> Odor: <u>NONE</u> PARAMETER MEASU	
PARAMETER MEASU	No. 3 No. 4 Sample
PARAMETER MEASU  Initial No. 1 No. 2	No. 3 No. 4 Sample
Gallons Purged: Description of the second se	No. 3   No. 4   Sample
Initial   No. 1   No. 2     Gallons Purged:	No. 3   No. 4   Sample
Initial   No. 1   No. 2	No. 3   No. 4   Sample
Gallons Purged: $\frac{S}{S}$	No. 3   No. 4   Sample

Well Casing Volumes

2.5° = 0.24 6° = 1.46 3" = 0.37

3.5" = 0.50

2" = 0.16 4" = 0.65



### Groundwater Sampling Log

#### Site Inspection

## Former Bradford Island Landfill Site Cascade Locks, Oregon

TC-10022-03

690/98 - BIL - Sample No.: <u>MW4 - 5W - 0</u>		ocation: MW - 4	-∕ Sa	umpling Date: 9	Page <u>/</u> of <u>/</u>
Sampling personnel:					
Weather Conditions:	5004 50	D.E			
····		EVACUATION D	ATA		
Measuring Point:	TOC			v Reference Surfa	ce·
_	32.15		ference Surface:	V Italianos Buria	70C_
-	17.38	<del></del>		aster Deading	12.1
Height of Water Column:			otoionization Det	_	vone.
	_		ickness of Floatin	ig Product:	2"
	<b>0.3</b> 6		sing Diameter:		
One Casing Volume:  Evacuation Method/Equipme	2.36	Ga Dane ( w. Ha	llons Purged prio	r to Sampling:	7.0
Evacuation Method/Equipme	ent: Z			17(a 001/h /	
<i>i</i> . <i>1</i>		NDWATER QUAI	LITY DATA	4	elist 4
Color: V. light grey	Odor: _	none	A <sub>I</sub>	opearance: 2	fondy :
·	PARAME'	TER MEASUREM	ENT EVENTS		· ~
<u>Initial</u>	<u>No. 1</u>	<u>No. 2</u>	No. 3	<u>No. 4</u>	<u>Sample</u>
Gallons Purged:	2.5	5.0	7.0 (A	If for Recovery	-)
Temperature: 6/16	60.Z	59.9	63.4		<u></u> .
pH: 6.90	6.05	5.68	6.27		<u>.</u>
Conductivity: 429	425	429	441		
Salinity:	<del></del>	<del></del>			
Turbidity: 2/	80	850	120		<del></del>
Comments: Well >	urged dry	at approx	x. 7.0 90	ellons @ 19.	50
18 cover	y = 0.1	Tio sec.			
		Well Casing Volumes	· · · · · · · · · · · · · · · · · · ·		
GAL/FT 1.25* = 0.077	1.5° = 0.10	2" = 0.16 4" = 0.65	2.5" = 0.24 6" = 1.46	3* = 0.37	3.5° = 0.50
* Collecte	d DA Sar	nfle 090198-BIL		2 F-1 2 4	1-10 E 1707
(C/: _ M	lun lun H	010198 BLC	-MWS-6W-0	1 W/A150 /	THEOLINE

#### **APPENDIX H**

#### LABORATORY ANALYTICAL REPORT



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### **ANALYTICAL REPORT FOR SAMPLES:**

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
8-17-98-BIL-SB1-SS-01	B808411-01	Soil	8/17/98
8-18-98-BIL-BK1-SS-01	B808411-02	Soil	8/18/98
8-18-98-BIL-BK2-SS-01	B808411-03	Soil	8/18/98
8-18-98-BIL-BK3-SS-01	B808411-04	Soil	8/18/98
8-19-98-BIL-PW1-SS-01	B808411-05	Soil	8/19/98
8-19-98-BIL-TP1-SS-01	B808411-06	Soil	8/19/98
8-19-98-BIL-TP2-SS-01	B808411-07	Soil	8/19/98
8-19-98-BIL-TP4-SS-01	B808411-08	Soil	8/19/98
8-20-98-BIL-TP6-SS-01	B808411-09	Soil	8/20/98
8-20-98-BIL-TP6-SS-02	B808411-10	Soil	8/20/98
8-20-98-BIL-TP5-SS-01	B808411-11	Soil	8/20/98
8-20-98-BIL-TP8-SS-01	B808411-12	Soil	8/20/98
8-20-98-BIL-TP7-SS-01	B808411-13	Soil	8/20/98
8-20-98-BIL-TP9-SS-01	B808411-14	Soil	8/20/98

Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





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Tetra Tech. Inc.Project:Bradford Island LandfillSampled:8/17/98 to 8/20/98600 University St.. Suite 800Project Number:10022-03Received:8/21/98Seattle, WA 98101Project Manager:Carlotta CellucciReported:9/25/98 13:58

#### Hydrocarbon Identification by Washington DOE Method NWTPH-HCID North Creek Analytical - Bothell

Batch	Date	Date	Surrogate	Reporting			
Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes
		R80841	11_01			Soil	
0880628	8/24/98		<u>11-71</u>	20.0	ND		
"	0/24/70	11				"	
11	**	•				n	
11	11	н				"	
		**		<del>-</del>		11	
	h					ti .	
			50.0-150		95.2	· · · · -	
		D0004	4.05			0.11	
0000/20	0/24/00		1-05	20.0			
				_			
		"		•			
				100			
"	"	"	50.0-150		97.9	%	
		B80841	1-06			<u>Soil</u>	
0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
**	11	11		50.0	ND	"	
	"	•		50.0	ND	"	
**	н	н		100	DET	н	
*1	**	11		100	ND	n .	
P†	**	u		100	DET	"	
"	. · · · · ·		50.0-150		96.0	%	
		B80841	1-07			Soil	
0880628	8/24/98	8/25/98		20.0	ND		
"	11	"				"	
	"					11	
••	11			<del>_</del>			
11	"	11				ıı.	
**	11	H				11	
"	"	"	50.0-150		96.2	%	
		R80841	1_08			Soil	
0880628	8/24/98	8/25/98	1-00	20.0	ND	mg/kg dry	
	Number  0880628  """  0880628  """  0880628  """  """  0880628	Number Prepared  0880628 8/24/98  """""""""""""""""""""""""""""""""""	Number Prepared Analyzed    B80841   0880628	Number   Prepared   Analyzed   Limits	Number	Number	Number   Prepared   Analyzed   Limits   Limit   Result   Units

orth Creek Analytical - Bothell



<sup>\*</sup>Refer to end of report for text of notes and definitions.



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

10022-03 Project Number:

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### Hydrocarbon Identification by Washington DOE Method NWTPH-HCID North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP4-SS-01 (continued)			B8084	11-08			<u>Soil</u>	
Diesel Range Hydrocarbons	0880628	8/24/98	8/25/98	<del></del>	50.0	ND	mg/kg dry	
Insulating Oil Range Hydrocarbons	**	н			100	ND	"	
Heavy Fuel Oil Range Hydrocarbons	н	tr	n .		100	ND	n	
Lube Oil Range Hydrocarbons	**	**	**		100	DET	п	
Surrogate: 2-FBP	;;		, , , , , , , , , , , , , , , , , , ,	50.0-150		98.7	%	
3-20-98-BIL-TP6-SS-01			B8084	<u> 11-09</u>			<u>Soil</u>	
Gx Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	**	11	п		50.0	ND	n	
Diesel Range Hydrocarbons	11	11	**		50.0	ND		
nsulating Oil Range Hydrocarbons	n.	10	11:		100	ND	n	
Heavy Fuel Oil Range Hydrocarbons		п	**		100	ND	Ħ	
Lube Oil Range Hydrocarbons	11		"		100	DET	**	
Surrogate: 2-FBP	,,	,,		50.0-150		99.6	%	
3-20-98-B1L-TP6-SS-02			B8084	L1-10			Soil	
Gx Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	u	**	ij		50.0	ND	"	
Diesel Range Hydrocarbons	11	"			50.0	ND	"	
nsulating Oil Range Hydrocarbons	н	n			100	ND		
leavy Fuel Oil Range Hydrocarbons	11	"	**		100	ND	u	
Lube Oil Range Hydrocarbons	"	11	"		100	DET	"	
Surrogate: 2-FBP	"	. <u>"</u>	,	50.0-150		101	%	
3-20-98-BIL-TP5-SS-01			B8084	<u>11-11</u>			<u>Soil</u>	
Gx Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	17	"	"		50.0	DET	"	
Diesel Range Hydrocarbons	н	**	•		50.0	DET	11	
nsulating Oil Range Hydrocarbons	n	••	••		100	ND	" ,	
leavy Fuel Oil Range Hydrocarbons	**	**	"		100	ND	11	
Lube Oil Range Hydrocarbons	**	**	"		100	DET	11	
Surrogate: 2-FBP	"	"	<b>"</b>	50.0-150		101	%	
8-20-98-BIL-TP8-SS-01			B8084	11-12			Soil	
3x Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	n	н	**		50.0	ND	"	
Diesel Range Hydrocarbons	•	п			50.0	ND	n	
nsulating Oil Range Hydrocarbons	H	11	**		100	ND	н	
-								

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definite

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PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101 Project Number: 10022-03 Project Manager: Carlotta Cellucci Received: 8/21/98 Reported: 9/25/98 13:58

#### Hydrocarbon Identification by Washington DOE Method NWTPH-HCID North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01 (continued)			<u>B8084</u>	11-12			<u>Soil</u>	
Heavy Fuel Oil Range Hydrocarbons	0880628	8/24/98	8/25/98	<del></del>	100	ND	mg/kg dry	
Lube Oil Range Hydrocarbons	••	"	"		100	DET	,,	
Surrogate: 2-FBP	"	"	<del>"</del> .	50.0-150		99.5	%	
8-20-98-BIL-TP7-SS-01			B8084	<u>11-13</u>			<u>Soil</u>	
Gx Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	25	11	n		50.0	ND	11	
Diesel Range Hydrocarbons	•	**	**		50.0	ND		
Insulating Oil Range Hydrocarbons	**	•			100	ND	**	
Heavy Fuel Oil Range Hydrocarbons	11	**	ч		100	ND	11	
Lube Oil Range Hydrocarbons	n	11	•		100	DET	н	
Surrogate: 2-FBP	,,	"	····	50.0-150		73.4	%	
								:
0-98-BIL-TP9-SS-01			B8084	<u>11-14</u>			<u>Soil</u>	
Gx Range Hydrocarbons	0880628	8/24/98	8/25/98		20.0	ND	mg/kg dry	
Kerosene Range Hydrocarbons	n	**	19		50.0	DET	11	
Diesel Range Hydrocarbons	10	н	**		50.0	DET	•	•
Insulating Oil Range Hydrocarbons	. "	"	n		100	ND	11	
Heavy Fuel Oil Range Hydrocarbons	n	••	**		100	ND	11	
Lube Oil Range Hydrocarbons	H .	H	n		100	DET	n	
Surrogate: 2-FBP			"	50.0-150		85.6	%	· · ·

th Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Charg, Project Manager



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<del></del>	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
9 10 00 DH TD1 CC 01			D0004	•••			6-11	
8-19-98-BIL-TP1-SS-01	0000	0/25/00	<u>B8084</u>	<u>I 1-06</u>	<b>70.0</b>	000	<u>Soil</u>	•
Diesel Range Hydrocarbons	0880788	8/27/98	8/28/98		50.0	920	mg/kg dry	1
Lube Oil Range Hydrocarbons					125	2360		
Surrogate: 2-FBP	"	"	"	50.0-150		77.6	%	
8-19-98-BIL-TP2-SS-01			B8084	<u>11-07</u>			<u>Soil</u>	
Diesel Range Hydrocarbons	0880788	8/27/98	8/28/98		10.0	132	mg/kg dry	1
Lube Oil Range Hydrocarbons	11	**	"		25.0	342	n	
Surrogate: 2-FBP	<i>"</i>	"		50.0-150		108	%	
8-19-98-BIL-TP4-SS-01			B8084	11-08	•		<u>Soil</u>	
Diesel Range Hydrocarbons	0880788	8/27/98	9/1/98	<u> </u>	10.0	27.4	mg/kg dry	1
Lube Oil Range Hydrocarbons	"	"	"		25.0	136	"	•
Surrogate: 2-FBP	·· - " -·· ·	<i>"</i>		50.0-150		105	%	- (
8-20-98-BIL-TP6-SS-01			D0004				C - 11	
_	0900700	0/27/00	<u>B8084</u>	<u> </u>	50.0	1000	<u>Soil</u>	
Diesel Range Hydrocarbons Lube Oil Range Hydrocarbons	0880788	8/27/98	8/28/98		50.0	1880	mg/kg dry "	ı
		,			125	4040		· · · · · · · · · · · · · · · · · · ·
Surrogate: 2-FBP			,,	50.0-150		102	%	
8-20-98-BIL-TP6-SS-02			B8084	<u>11-10</u>			Soil .	
Diesel Range Hydrocarbons	0880788	8/27/98	8/31/98		10.0	81.9	mg/kg dry	1
Lube Oil Range Hydrocarbons	"	**	"		25.0	533	tt	
Surrogate. 2-FBP	,,	<i>"</i>	"	50.0-150		101	%	
8-20-98-BIL-TP5-SS-01			B8084	11-11			Soil	
Diesel Range Hydrocarbons	0880788	8/27/98	9/1/98		50.0	9780	mg/kg dry	1
Lube Oil Range Hydrocarbons	"	11	"		125	20200	"	
Surrogate: 2-FBP	"		,, -·	50.0-150		117	%	
8-20-98-BIL-TP8-SS-01			<u>B8084</u>	11-12			<u>Soil</u>	
Diesel Range Hydrocarbons	0880788	8/27/98	8/31/98	<u> </u>	10.0	202	mg/kg dry	1
Lube Oil Range Hydrocarbons	"	0/2//20	0/31/70		25.0	951	mg/kg dry	
Surrogate: 2-FBP	. "	··· <i>n</i>		50.0-150	25.0	<u> </u>	%	
8 30 08 DH TD7 55 01			<b>D</b> 0004	11 17			Ca:I	
8-20-98-BIL-TP7-SS-01	0000000	0/37/00	<u>B8084</u>	11-13	110	1000	<u>Soil</u>	,
Diesel Range Hydrocarbons	0880788	8/27/98	9/1/98		110	1900	mg/kg dry "	ì
Lube Oil Range Hydrocarbons	"	" "	"	500 150	275	2790		
Surrogate: 2-FBP		"	"	50.0-150		92.4	%	

North Creek Analytical - Bothell





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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled:

8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

9/25/98 13:58 Reported:

#### Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
8-20-98-BIL-TP9-SS-01			B8084	<u>11-14</u>			<u>Soil</u>	
Diesel Range Hydrocarbons	0880788	8/27/98	8/31/98		110	8700	mg/kg dry	1
Lube Oil Range Hydrocarbons	**	11	**		275	31400	11	
Surrogate: 2-FBP	<i>"</i>	,,	<u> </u>	50.0-150		102	<del>%</del>	- · - <del></del>

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Tetra Tech. Inc.

600 University St., Suite 800 Seattle, WA 98101

Project: Project Number:

Bradford Island Landfill

10022-03

Project Manager: Carlotta Cellucci Sampled: 8/17/98 to 8/20/98

Reported: 9/25/98 13:58

Received: 8/21/98

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
						· · ·		
8-18-98-BIL-BK1-SS-01			<u>B8084</u>				<u>Soil</u>	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	12000	mg/kg dry	
Calcium	n	t <del>)</del>	"	EPA 6010B	15.0	6180	"	
Iron	n	H	"	EPA 6010B	8.00	18900	**	
Magnesium	H	n	**	EPA 6010B	10.0	7090	11	
Sodium	н	11	9/17/98	EPA 6010B	25.0	295	"	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	ND		
Arsenic	11	†I	**	EPA 6020	0.500	2.77	"	
Barium	n	11	**	EPA 6020	5.00	77.0	**	
Beryllium	H		11	EPA 6020	0.500	ND	*1	
Cadmium	**	"	"	EPA 6020	0.500	ND	*1	
Chromium	и	"	11	EPA 6020	0.500	11.9	"	
Cobalt	н	**	н	EPA 6020	0.500	11.4	"	
Copper	n	••	н	EPA 6020	0.500	45.0	11	
Lead	••	11	н	EPA 6020	0.500	14.2	u	
Manganese	**	**	н	EPA 6020	1.00	368	**	
Nickel	**	"	n	EPA 6020	0.500	16.3		
Selenium	"	**	n	EPA 6020	0.500	0.801		
Silver	n	н	n	EPA 6020	0.500	ND	n	
Thallium	n	п	**	EPA 6020	0.500	ND		
Vanadium	"		11	EPA 6020	0.500	42.2	**	
Zinc	**		n	EPA 6020	5.00	53.6	"	
Mercury	0980054	9/2/98	11	EPA 7471A	0.100	0.101	н	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	242	11	
8-18-98-BIL-BK2-SS-01			B8084	11-03			<u>Soil</u>	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	19500	mg/kg dry	
Calcium	"	"	"	EPA 6010B	15.0	8030	mg/kg ary	
Iron	"	11	.,	EPA 6010B	8.00	25600		
Magnesium	ŋ		**	EPA 6010B	10.0	11700	**	
Sodium	11		9/17/98	EPA 6010B	25.0	393		
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	ND	**	
Arsenic	U7 <u>0</u> 0036	7/1/70	9/3/90	EPA 6020	0.500	3.24	n	
Barium	п	11	11	EPA 6020 EPA 6020	5.00	95.5	u	
Beryllium		D	"			0.554	11	
Cadmium	11	n	••	EPA 6020	0.500		п	
Chromium	n		11	EPA 6020	0.500	0.575	н	
Cobalt			".	EPA 6020	2.50	19.2	,,	
		"	"	EPA 6020	2.50	18.9		
Copper	~	**	**	EPA 6020	2.50	49.9		

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Reported: 9/25/98 13:58

Tetra Tech. Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98 600 University St., Suite 800 Received: 8/21/98 Project Number: 10022-03 Seattle, WA 98101 Project Manager: Carlotta Cellucci

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
8-18-98-BIL-BK2-SS-01 (continued)			B8084	11_03			<u>Soil</u>	
Lead	0980038	9/1/98	9/3/98	EPA 6020	0.500	18.7	mg/kg dry	
Manganese	"	"	"	EPA 6020	2.50	610	"	
Nickel	"	n	11	EPA 6020	2.50	24.2	и	
Selenium	,	•	**	EPA 6020	0.500	ND	11	
Silver	•		**	EPA 6020	0.500	ND	**	
Thallium	"	,,	"	EPA 6020	0.500	ND	н	•
Vanadium	•	11		EPA 6020	2.50	61.5	II .	
Zinc	••	**	••	EPA 6020	5.00	55.9	13	
Mercury	0980054	9/2/98	**	EPA 7471A	0.100	ND	u .	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	751	11	
	3,000	,,,,,	,,,,,,,	2				
<u>8-18-98-BIL-BK3-SS-01</u>			B8084	<u>l 1-04</u>			<u>Soil</u>	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	20200	mg/kg dry	
lcium		"	••	EPA 6010B	15.0	7890	**	
rron	U	н	н	EPA 6010B	8.00	28300	**	
Magnesium	11	**	••	EPA 6010B	10.0	15900	**	
Sodium	*1	11	9/17/98	EPA 6010B	25.0	239	10	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	ND	"	
Arsenic	**	n		EPA 6020	0.500	2.92	D	
Barium	10	**	11	EPA 6020	5.00	139	ti	
Beryllium	**	11	••	EPA 6020	0.500	0.622	"	
Cadmium	11	H	ři.	EPA 6020	0.500	ND	11	
Chromium	••	**	**	EPA 6020	0.500	21.3	n	
Cobalt	н	•	**	EPA 6020	0.500	17.5		
Copper	••		••	EPA 6020	0.500	53.6	**	
Lead		It	10"	EPA 6020	0.500	8.67	11	
Manganese	n	'n	11	EPA 6020	1.00	460	tr	
Nickel	**	11		EPA 6020	0.500	19.2	н	
Selenium		**		EPA 6020	0.500	ND	H	
Silver	**		n	EPA 6020	0.500	ND	11	
Thallium		•	"	EPA 6020	0.500	ND	11	
Vanadium	н	н	"	EPA 6020	0.500	73.0	н	
Zinc	**	"	"	EPA 6020	5.00	60.4	n	
Mercury	0980054	9/2/98	"	EPA 7471A	0.100	ND	11	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	507	"	
8-19-98-BIL-TP1-SS-01			B80841	1-06			Soil	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	16600	mg/kg dry	

rth Creek Analytical - Bothell

Joy B Chang, Project Manager

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<sup>\*</sup>Refer to end of report for text of notes and definitions.



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Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting		·	
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
		•		-				
8-19-98-BIL-TP1-SS-01 (continued)			B8084				<u>Soil</u>	
Calcium	0980293	9/11/98	9/10/98	EPA 6010B	15.0	9740	mg/kg dry	
Iron	II.	**	9/18/98	EPA 6010B	32.0	52700	"	
Magnesium	"	"	9/10/98	EPA 6010B	10.0	5180	**	
Sodium	"	"	9/17/98	EPA 6010B	25.0	471	"	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	4.49	**	
Arsenic	"	**	"	EPA 6020	0.500	9.73	**	
Barium	••	11	4	EPA 6020	250	567	"	
Beryllium	**	**	11	EPA 6020	0.500	ND	*1	
Cadmium	H		н	EPA 6020	0.500	195	11	
Chromium	н	11	11	EPA 6020	0.500	60.1	n	
Cobalt	•	11	н	EPA 6020	0.500	17.2	"	
Copper		•	**	EPA 6020	25.0	1620	ч	
_ead		"	н	EPA 6020	25.0	7140	•	
Manganese	**	**	н	EPA 6020	25.0	1830	11	•
lickel	**	**	*	EPA 6020	0.500	84.0	***	
elenium	10			EPA 6020	0.500	ND	•	
iilver	*	**		EPA 6020	0.500	46.0	11	
Challium	••	**		EPA 6020	0.500	ND	11	
/anadium	**	•	н	EPA 6020	0.500	26.9	**	
Zinc		**	н	EPA 6020	250	8650	n	
Aercury	0980054	9/2/98	н	EPA 7471A	0.500	1.61	"	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	788	"	
8-19-98-BIL-TP4-SS-01			D0084	11.00			6.11	
Aluminum	0980293	0/11/00	B8084		10.0	11300	Soil	
Calcium	0980293	9/11/98	9/10/98	EPA 6010B	10.0	11200	mg/kg dry "	
ron		11	**	EPA 6010B	15.0	6610	**	
		,,		EPA 6010B	8.00	21500		
lagnesium				EPA 6010B	10.0	7070		
Sodium			9/17/98	EPA 6010B	25.0	585	**	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	ND		
Arsenic	"	"		EPA 6020	0.500	2.18	"	
Barium 	"			EPA 6020	5.00	84.6	"	
Beryllium	11	ti	11	EPA 6020	0.500	ND	"	
admium	n	"	n	EPA 6020	0.500	ND	"	
Chromium	"	n	н	EPA 6020	0.500	9.12	"	
Cobalt	n	n	H	EPA 6020	0.500	8.28	11	
Copper	u	**	**	EPA 6020	0.500	28.5	"	
Lead	••	**	**	EPA 6020	0.500	189		

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defi

Joy B Chang.

18939 120th Avenue N.E., Suite 101. Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton, OR 97008-7132



BOTHELL \* (425) 420-9200 \* FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03 Project Manager:

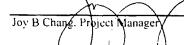
Carlotta Cellucci

Received: 8/21/98 Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Note
8-19-98-BIL-TP4-SS-01 (continued)			B8084	11-08			Soil	
Manganese	0980038	9/1/98	9/3/98	EPA 6020	1.00	273	mg/kg dry	
Nickel	"	0	n .	EPA 6020	0.500	14.0	"	
Selenium	••	••	**	EPA 6020	0.500	ND	••	
Silver	14	"	**	EPA 6020	0.500	ND	**	
Thallium	**	••	**	EPA 6020	0.500	ND	"	
Vanadium	"	n		EPA 6020	0.500	34.3	"	
Zinc	**	"	**	EPA 6020	5.00	57.9	11	
Mercury	0980054	9/2/98	**	EPA 7471A	0.100	ND	11	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	723	**	
8-20-98-BIL-TP6-SS-01			B80841	L1-09			Soil	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	. 10.0	16000	mg/kg dry	
Çalcium	**	"	••	EPA 6010B	15.0	8870	"	
on			**	EPA 6010B	8.00	22400	"	
Magnesium	"	•	**	EPA 6010B	10.0	7840	**	
Sodium		**	9/17/98	EPA 6010B	25.0	570	11	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	ND	"	
Arsenic	**	н	**	EPA 6020	0.500	1.75	"	
Barium	H	n .		EPA 6020	5.00	87.6	11	
Beryllium	**	11		EPA 6020	0.500	ND	11	
Cadmium	**	**	tr .	EPA 6020	0.500	1.60	н	
Chromium	er e	P	н	EPA 6020	0.500	9.34	11	
Cobalt	n	b	n	EPA 6020	0.500	7.92	11	
Copper	••	11	**	EPA 6020	0.500	53.0	**	
Lead	**	ч	н	EPA 6020	2.50	1120	n	
Manganese	н	**	**	EPA 6020	0.500	211	**	
Nickel	**	tt	н	EPA 6020	0.500	20.4	n	
Selenium	U	11	"	EPA 6020	0.500	ND	n	
Silver	"	"	н	EPA 6020	0.500	ND	"	
Challium	"	"	n	EPA 6020	0.500	ND	n	
√anadium		n	"	EPA 6020	0.500	31.5	11	
Line	11	11	**	EPA 6020	5.00	130	n	
Mercury	0980054	9/2/98	n	EPA 7471A	0.100	ND	11	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	688	"	
B-20-98-BIL-TP5-SS-01			B80841	1-11			Soil	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	12600	mg/kg dry	
Calcium	"	**	"	EPA 6010B	15.0	5050	"	•

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
8-20-98-BIL-TP5-SS-01 (continued)			B8084	11-11			<u>Soil</u>	
Iron	0980293	9/11/98	9/10/98	EPA 6010B	8.00	18100	mg/kg dry	
Magnesium	"	"	"	EPA 6010B	10.0	5860	"	
Sodium	**	**	9/17/98	EPA 6010B	25.0	404	н	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	0.874	"	
Arsenic	"	н	"	EPA 6020	0.500	3.04	"	
Barium	**	н		EPA 6020	5.00	136	н	
Beryllium	**			EPA 6020	0.500	ND	ıı	
Cadmium	"	11	**	EPA 6020	0.500	4.54	**	
Chromium	n	n .	**	EPA 6020	0.500	14.0	n	
Cobalt	н	**	11	EPA 6020	0.500	9.02		
Copper	н	17		EPA 6020	0.500	55.1	11	
Lead	ti.	••	"	EPA 6020	0.500	193	19	
Manganese	••	**	**	EPA 6020	2.50	362	**	
Nickel		11	**	EPA 6020	0.500	17.7	11	(e
Selenium				EPA 6020	0.500	ND		
Silver	"			EPA 6020	0.500	ND	**	
Fhallium	"	••	11	EPA 6020	0.500	ND	n	
Vanadium	,,		**	EPA 6020	0.500	40.9	"	
Zinc	11	**		EPA 6020	5.00	114	II	
Mercury	0980054	9/2/98		EPA 7471A	0.500	1.66	n	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	1100	n	
8-20-98-BIL-TP8-SS-01			B8084	11-12			<u>Soil</u>	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	9020	mg/kg dry	
Calcium	"	"	"	EPA 6010B	15.0	6830	"	
Iron	.,			EPA 6010B	8.00	16900	,,	
Magnesium	11	.,	"	EPA 6010B	10.0	5840	п	
Sodium	11	"	9/17/98	EPA 6010B	25.0	433	11	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	3.05	n	
Arsenic	"	"	"	EPA 6020	0.500	5.35	,,	
Barium	1)		н	EPA 6020	5.00	156		
Bervllium				EPA 6020	0.500	ND	**	
Cadmium	n	**	**	EPA 6020	0.500	5.03	н	
Chromium		11	11	EPA 6020	0.500	13.5	н	
Cobalt	11	ti	n	EPA 6020	0.500	10.7	11	
Copper	н	**	**	EPA 6020	0.500	204	,	
Lead	н	11	**	EPA 6020	2.50	403	"	
Manganese	**		н	EPA 6020	2.50	381	**	
				LI A 0020	2.50	501		,

North Creek Analytical - Bothell





PORTLAND - (503) 906-9200 - FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Received: 8/21/98

Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
9 30 00 BH TB0 CC 01 (2004)			<b>D</b> 0004	11 12			Sail	
8-20-98-BIL-TP8-SS-01 (continued) Nickel	0980038	0/1/00	<u>B8084</u>		0.500	21.3	<u>Soil</u> mg/kg dry	
Selenium	0980038	9/1/98	9/3/98	EPA 6020	0.500	21.3 ND	mg/kg ary	
Silver	••	"		EPA 6020	0.500		,,	
Thallium	н	,,	"	EPA 6020	0.500	12.0 ND	"	
Vanadium				EPA 6020	0.500	37.1	,,	
Zinc	,,	"	11	EPA 6020	0.500		,,	
			" "	EPA 6020	25.0	381	D	
Mercury	0980054	9/2/98		EPA 7471A	0.500	3.50	n	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	689		
8-20-98-BIL-TP9-SS-01			B80841	<u>11-14</u>			<u>Soil</u>	
Aluminum	0980293	9/11/98	9/10/98	EPA 6010B	10.0	13200	mg/kg dry	
Calcium		11	"	EPA 6010B	15.0	5420	н	
ron	н	**	H	EPA 6010B	8.00	22300	11	
Magnesium	**	н	11	EPA 6010B	10.0	5660	n	
Sodium	"	n	9/17/98	EPA 6010B	25.0	344	n	
Antimony	0980038	9/1/98	9/3/98	EPA 6020	0.500	1.16	n	
Arsenic		11	11	EPA 6020	0.500	2.11	n	
Barium	•	**	**	EPA 6020	5.00	98.3	"	
Beryllium	n		"	EPA 6020	0.500	ND		
Cadmium	"	" .	•	EPA 6020	0.500	3.55	"	
Chromium	"	n		EPA 6020	0.500	12.6		
Cobalt	**	н	•	EPA 6020	0.500	7.93	11	
Copper		H	n	EPA 6020	0.500	44.7	··	
Lead	It	11	"	EPA 6020	0.500	151	н	
Manganese	"	**	"	EPA 6020	2.50	290	11	
Nickel	11	11	"	EPA 6020	0.500	15.3	••	
Selenium	**	**	."	EPA 6020	0.500	ND		
Silver	11	11		EPA 6020	0.500	ND	н	
Thallium	"	11	**	EPA 6020	0.500	ND	•	
Vanadium	н	**	"	EPA 6020	0.500	38.3	**	
Zinc	11	11	**	EPA 6020	5.00	85.7	n	
Mercury	0980054	9/2/98	**	EPA 7471A	0.500	3.52	P	
Potassium	0980564	9/9/98	9/10/98	EPA 6010B	10.0	820	11	

Vorth Creek Analytical - Bothell





PORTLAND • (503) 906-9200 • FAX 906-921

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98 Received: 8/21/98

Seattle, WA 98101

600 University St., Suite 800

Project Number: 10022-03 Project Manager:

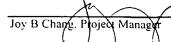
Carlotta Cellucci

Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
8-17-98-BIL-SB1-SS-01			B80841	11-01			Soil	
Aluminum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	10.2	mg/l	
Antimony	0980288	11	9/17/98	EPA 6020	0.100	ND	"	
Arsenic	II	н	9/15/98	EPA 6020	0.200	ND	•	
Barium	**	"	0	EPA 6020	1.00	ND	"	
Beryllium	**	н	9/17/98	EPA 6020	0.00500	ND	**	
Cadmium	"	**	9/15/98	EPA 6020	0.00500	ND	••	
Calcium	0980291	n	9/10/98	EPA 6010B	0.250	5.55	"	
Chromium	0980288	"	9/15/98	EPA 6020	0.0100	0.0120	**	
Cobalt	**	**	11	EPA 6020	0.0100	ND	0	
Copper	**	•		EPA 6020	0.0300	0.0350		
Iron	0980291	н	9/10/98	EPA 6010B	0.150	21.6		
Lead	0980288	**	9/15/98	EPA 6020	0.200	ND	"	
Magnesium	0980291	"	9/10/98	EPA 6010B	0.500	14.5	"	
Manganese	0980288	**	9/15/98	EPA 6020	0.00500	0.340	•	
Nickel	"	**	,,	EPA 6020	0.0300	ND	•	
Potassium	0980291	"	9/10/98	EPA 6010B	0.200	1.78		
Selenium	0980288	•	9/15/98	EPA 6020	0.150	ND	"	
Silver	"	"	•1	EPA 6020	0.0500	ND	"	
Sodium	0980291	"	9/10/98	EPA 6010B	0.500	64.1		
Thallium	0980288	"	9/15/98	EPA 6020	0.200	ND	"	
Vanadium	n	"		EPA 6020	0.200	ND	**	
Zinc	"	"	re	EPA 6020	0.0500	. ND	"	
Mercury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	0.00162	"	
8-18-98-BIL-BK2-SS-01	·		B80841	11-03			Soil	
Aluminum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	7.90	mg/l	
Antimony	0980288	"	9/17/98	EPA 6020	0.100	ND	"	•
Arsenic	"	"	9/15/98	EPA 6020	0.200	ND	11	
Barium	**		r	EPA 6020	1.00	ND	н	
Beryllium	11	· ·	9/17/98	EPA 6020	0.00500	ND	n	
Cadmium	"	"	9/15/98	EPA 6020	0.00500	ND	n	
Calcium	0980291	· ·	9/10/98	EPA 6010B	0.250	2.71	n	
Chromium	0980288	**	9/15/98	EPA 6020	0.0100	ND	n	
Cobalt	"		"	EPA 6020	0.0100	ND	11	
Copper	11		n	EPA 6020	0.0300	ND	11	
Iron	0980291	10	9/10/98	EPA 6010B	0.150	10.6	**	
Lead	0980288		9/15/98	EPA 6020	0.200	ND	*	
Magnesium	0980291	n	9/10/98	EPA 6010B	0.500	3.81	н	

North Creek Analytical - Bothell





PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number:

10022-03

Received: 8/21/98

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes
8-18-98-BIL-BK2-SS-01 (continued)			B8084	11-03			<u>Soil</u>	
Manganese	0980288	9/9/98	9/15/98	EPA 6020	0.00500	0.0546	mg/l	
Nickel	"	н	"	EPA 6020	0.0300	ND	"	
Potassium	0980291	••	9/10/98	EPA 6010B	0.200	0.207	**	
Selenium	0980288	н	9/15/98	EPA 6020	0.150	ND	"	
Silver	"	**	"	EPA 6020	0.0500	ND	н	
Sodium	0980291	n	9/10/98	EPA 6010B	0.500	61.2	11	
Thallium	0980288	"	9/15/98	EPA 6020	0.200	ND	Ħ	
Vanadium	"	н	"	EPA 6020	0.200	ND	ч	
Zinc	"		н	EPA 6020	0.0500	ND		
Mercury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	ND	u	
8-18-98-BIL-BK3-SS-01			B80841	11-04			Soil	
Aluminum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	6.75	mg/l	
ntimony	0980288	"	9/17/98	EPA 6020	0.100	ND	"	
rsenic	"	••	9/15/98	EPA 6020	0.200	ND	**	
Barium	n	11	n	EPA 6020	1.00	ND	**	
Beryllium	**	n	9/17/98	EPA 6020	0.00500	ND	11	
Cadmium	••	, m	9/15/98	EPA 6020	0.00500	ND	"	
Calcium	0980291	"	9/10/98	EPA 6010B	0.250	2.38	n	
Chromium	0980288	n	9/15/98	EPA 6020	0.0100	0.0110		
Cobalt	41	**	11	EPA 6020	0.0100	ND		
Copper	11	н	••	EPA 6020	0.0300	ND	н	
ron	0980291	11	9/10/98	EPA 6010B	0.150	10.3		
ead	0980288	н	9/15/98	EPA 6020	0.200	ND	n n	
lagnesium	0980291	**	9/10/98	EPA 6010B	0.500	4.39	**	
langanese	0980288	**	9/15/98	EPA 6020	0.00500	0.0586	н	
ickel	"	**	"	EPA 6020	0.0300	ND	**	
Potassium	0980291	0	9/10/98	EPA 6010B	0.200	ND	п	
selenium	0980288		9/15/98	EPA 6020	0.150	ND	**	
ilver	"	n	"	EPA 6020	0.0500	ND	,,	
odium	0980291	"	9/10/98	EPA 6010B	0.500	61.8	"	
'hallium	0980288	и	9/15/98	EPA 6020	0.200	ND	•	
/anadium	"		"	EPA 6020	0.200	ND	n	
Zinc			"	EPA 6020	0.0500	ND	11	
Aereury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	ND	ri .	
8-19-98-BIL-PW1-SS-01			<u>B80841</u>	1-05			<u>Soil</u>	
Numinum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	5.18	mg/l	

orth Creek Analytical - Bothell



<sup>\*</sup>Refer to end of report for text of notes and definitions.



PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech. Inc. 600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

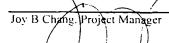
Received: 8/21/98

Reported: 9/25/98 13:58

SPLP Metals by EPA 1311/6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
8-19-98-BIL-PW1-SS-01 (continued)			B80841	11-05			Soil	
Antimony	0980288	9/9/98	9/17/98	EPA 6020	0.100	ND	mg/l	
Arsenic	"	н	9/15/98	EPA 6020	0.200	ND	"	
Barium	• •	n	n	EPA 6020	1.00	ND	**	
Beryllium	n	**	9/17/98	EPA 6020	0.00500	ND	**	
Cadmium	•	n	9/15/98	EPA 6020	0.00500	ND	n	
Calcium	0980291	n	9/10/98	EPA 6010B	0.250	2.03	••	
Chromium	0980288	**	9/15/98	EPA 6020	0.0100	ND	**	
Cobalt	11	,,	"	EPA 6020	0.0100	ND	n	
Соррег		**		EPA 6020	0.0300	ND	п	
Iron	0980291		9/10/98	EPA 6010B	0.150	8.81	н	
Lead	0980288		9/15/98	EPA 6020	0.200	ND	н	
Magnesium	0980291	**	9/10/98	EPA 6010B	0.500	4.16	н	
Manganese	0980288	"	9/15/98	EPA 6020	0.00500	0.0994	н	
Nickel	"		"	EPA 6020	0.0300	ND	**	(1
Potassium	0980291	"	9/10/98	EPA 6010B	0.200	0.472	11	$\sim$
Selenium	0980288	**	9/15/98	EPA 6020	0.150	ND	14	
Silver	,,	••	"	EPA 6020	0.0500	ND	**	
Sodium	0980291		9/10/98	EPA 6010B	0.500	64.3		
Thallium	0980288		9/15/98	EPA 6020	0.200	ND	**	
Vanadium	•1	11		EPA 6020	0.200	ND	•	
Zine	••	**	••	EPA 6020	0.0500	ND	51	
Mercury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	ND	**	
8-19-98-BIL-TP2-SS-01			B80841	<u> 11-07</u>			Soil	
Aluminum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	2.21	mg/l	
Antimony	0980288	"	9/17/98	EPA 6020	0.100	ND	•	
Arsenic	fr	11	9/15/98	EPA 6020	0.200	ND	"	
Barium	**	"		EPA 6020	1.00	ND		
Beryllium	*1	11	9/17/98	EPA 6020	0.00500	ND	••	
Cadmium	**	11	9/15/98	EPA 6020	0.00500	. ND	"	
Calcium	0980291	"	9/10/98	EPA 6010B	0.250	9.50	11	
Chromium	0980288	"	9/15/98	EPA 6020	0.0100	ND	"	
Cobalt	n	11	11	EPA 6020	0.0100	ND	0	
Copper	н	**	**	EPA 6020	0.0300	ND	11	
Iron	0980291	"	9/10/98	EPA 6010B	0.150	4.64	11	
Lead	0980288	•	9/15/98	EPA 6020	0.200	ND	11	
Magnesium	0980291	11	9/10/98	EPA 6010B	0.500	2.40	11	
Manganese	0980288	•	9/15/98	EPA 6020	0.00500	0.0343	"	

North Creek Analytical - Bothell





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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
8-19-98-BIL-TP2-SS-01 (continued)			<u>B8084</u>				<u>Soil</u>	
Nickel	0980288	9/9/98	9/15/98	EPA 6020	0.0300	. ND	mg/l	•
Potassium	0980291	"	9/10/98	EPA 6010B	0.200	ND	IF	
Selenium	0980288	"	9/15/98	EPA 6020	0.150	ND	**	
Silver	**	16	n	EPA 6020	0.0500	ND	H	
Sodium	0980291		9/10/98	EPA 6010B	0.500	45.8	10	
Thallium	0980288	**	9/15/98	EPA 6020	0.200	ND	11	
Vanadium	11	**	**	EPA 6020	0.200	ND	11	
Zinc	•	н	"	EPA 6020	0.0500	ND		
Mercury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	ND	"	
8-20-98-BIL-TP6-SS-02			B8084	11-10			<u>Soil</u>	
Aluminum	0980291	9/9/98	9/10/98	EPA 6010B	0.500	5.61	mg/l	
Antimony	0980288	н	9/17/98	EPA 6020	0.100	ND	,,	
senic	"	n	9/15/98	EPA 6020	0.200	ND	n	
Barium	11	tt.	"	EPA 6020	1.00	ND	11	•
Bervllium	**	11	9/17/98	EPA 6020	0.00500	ND	11	
Cadmium	"	11	9/15/98	EPA 6020	0.00500	ND	**	_
Całcium	0980291	"	9/10/98	EPA 6010B	0.250	1.85		
Chromium	0980288	,,	9/15/98	EPA 6020	0.0100	ND		
Cobali	"	11	"	EPA 6020	0.0100	ND	n	
Copper	н		,,	EPA 6020	0.0300	0.0302	11	
ron	0980291	**	9/10/98	EPA 6010B	0.150	8.73		
_ead	0980288	11	9/15/98	EPA 6020	0.130	ND		
Magnesium	0980291	**	9/10/98	EPA 6010B	0.500	2.22	**	
langanese	0980288	11	9/15/98	EPA 6020	0.00500	0.144	**	
lickel	"	,,	7/13/76	EPA 6020	0.00300	ND	1)	
otassium	0980291	16	9/10/98		0.0300	0.394	It	
elenium		**		EPA 6010B			**	
ölver	0980288		9/15/98 "	EPA 6020	0.150	ND	**	
		11		EPA 6020	0.0500	ND		
odium	0980291		9/10/98	EPA 6010B	0.500	43.5		
hallium	0980288		9/1 <i>5/</i> 98 "	EPA 6020	0.200	ND	"	
⁄anadium 	"	"	"	EPA 6020	0.200	ND		
Zinc -				EPA 6020	0.0500	0.0746	*1	
lercury	0980053	9/2/98	9/3/98	EPA 7470A	0.00100	0.00196	**	
-20-98-BIL-TP7-SS-01			B80841	1-13			<u>Soil</u>	
Muminum	0980291	9/9/98	9/11/98	EPA 6010B	0.500	2.06	mg/l	
Antimony	0980288	n	9/17/98	EPA 6020	0.100	ND	"	•

orth Creek Analytical - Bothell





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Tetra Tech, Inc.

Project: Br

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods North Creek Analytical - Bothell

Batch	Date	Date	Specific	Reporting			
Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
		B8084	<u>11-13</u>			<u>Soil</u>	
0980288	9/9/98	9/15/98	EPA 6020	0.200	ND	mg/l	
•	**	н	EPA 6020	1.00	ND	11	
"	**	9/18/98	EPA 6020	0.00500	ND	11	
11	**	9/15/98	EPA 6020	0.00500	ND	11	
0980291	**	9/11/98	EPA 6010B	0.250	1.52	**	
0980288	**	9/15/98	EPA 6020	0.0100	ND	**	
н	**	н	EPA 6020	0.0100	ND	**	
n			EPA 6020	0.0300	ND	**	
0980291	**	9/11/98	EPA 6010B	0.150	3.96	**	
0980288	17	9/15/98	EPA 6020	1.00	1.35	и,	
0980291	. #	9/11/98	EPA 6010B	0.500	ND	н	
0980288		9/15/98	EPA 6020	0.00500	0.0445	**	
n	n	"	EPA 6020	0.0300	ND	"	
0980291	"	9/11/98	EPA 6010B	0.200	0.657	**	( )
0980288	**	9/15/98	EPA 6020	0.150	ND	H	
н		"	EPA 6020	0.0500	ND	D	
0980291	0	9/11/98	EPA 6010B	0.500	22.3		
0980288	"	9/15/98	EPA 6020	0.200	ND	"	
н	"	н	EPA 6020		ND		
n	••	н	EPA 6020	0.0500	ND	"	
0980053	9/2/98	9/3/98	EPA 7470A	0.00100	ND	n .	
	0980288 " " 0980291 0980291 0980288 " 0980291 0980288 " 0980291 0980288 " 0980291 0980288 "	Number Prepared  0980288 9/9/98 " " " " 0980291 " 0980291 " 0980291 " 0980291 " 0980291 " 0980288 " " " " 0980291 " 0980288 " " " " " 0980291 " 0980288 " " " " " " " " " " " " " " " " " " "	Number         Prepared         Analyzed           B8084         0980288         9/9/98         9/15/98           """"""""""""""""""""""""""""""""""""	Number         Prepared         Analyzed         Method           B808411-13           0980288         9/9/98         9/15/98         EPA 6020           "         "         EPA 6020           "         "         9/18/98         EPA 6020           "         "         9/15/98         EPA 6020           0980291         "         9/11/98         EPA 6010B           0980288         "         9/15/98         EPA 6020           "         "         EPA 6020           0980291         "         9/11/98         EPA 6010B           0980288         "         9/15/98         EPA 6010B           0980288         "         9/15/98         EPA 6020           0980291         "         9/11/98         EPA 6020           0980288         "         9/15/98         EPA 6010B           0980288         "         9/15/98         EPA 6020           0980288         "         9/15/98         EPA 6020           0980288         "         "         EPA 6020           0980288         "         9/15/98         EPA 6020           0980288         "         "         EPA 6020      <	Number         Prepared         Analyzed         Method         Limit           B808411-13           0980288         9/9/98         9/15/98         EPA 6020         0.200           "         "         EPA 6020         1.00           "         "         9/18/98         EPA 6020         0.00500           "         "         9/15/98         EPA 6020         0.00500           0980291         "         9/11/98         EPA 6010B         0.250           0980288         "         9/15/98         EPA 6020         0.0100           "         "         "         EPA 6020         0.0300           0980291         "         9/11/98         EPA 6010B         0.150           0980288         "         9/15/98         EPA 6020         1.00           0980288         "         9/15/98         EPA 6020         0.00500           "         "         "         EPA 6020         0.00500           0980288         "         9/15/98         EPA 6020         0.0500           0980291         "         9/11/98         EPA 6020         0.0500           0980291         "         9/15/98         EPA 6020	Number         Prepared         Analyzed         Method         Limit         Result           B808411-13           0980288         9/9/98         9/15/98         EPA 6020         0.200         ND           "         "         EPA 6020         1.00         ND           "         "         9/18/98         EPA 6020         0.00500         ND           "         "         9/15/98         EPA 6020         0.00500         ND           0980291         "         9/11/98         EPA 6020         0.0100         ND           "         "         "         EPA 6020         0.0100         ND           "         "         "         EPA 6020         0.0100         ND           "         "         "         EPA 6020         0.0100         ND           "         "         "         EPA 6020         0.0300         ND           0980291         "         9/11/98         EPA 6010B         0.150         3.96           0980288         "         9/15/98         EPA 6020         1.00         1.35           0980288         "         9/15/98         EPA 6020         0.0300         ND	Number         Prepared         Analyzed         Method         Limit         Result         Units           0980288         9/9/98         9/15/98         EPA 6020         0.200         ND         mg/l           "         "         EPA 6020         1.00         ND         "           "         "         9/18/98         EPA 6020         0.00500         ND         "           "         "         9/15/98         EPA 6020         0.00500         ND         "           0980291         "         9/11/98         EPA 6020         0.00500         ND         "           0980288         "         9/15/98         EPA 6020         0.0100         ND         "           "         "         "         EPA 6020         0.0100         ND         "           "         "         "         EPA 6020         0.0100         ND         "           "         "         "         EPA 6020         0.0300         ND         "           0980291         "         9/11/98         EPA 6010B         0.150         3.96         "           0980288         "         9/15/98         EPA 6020         0.00500         ND

North Creek Analytical - Bothell





Seattle, WA 98101

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Reported: 9/25/98 13:58

Tetra Tech, Inc.
Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98
600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98

Project Manager: Carlotta Cellucci

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

·	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-17-98-BIL-SB1-SS-01			B80841	<u> 11-01</u>			Soil	<u>2</u>
Aldrin	0880705	8/25/98	9/22/98		1.00	ND	ug/kg dry	
alpha-BHC	**	н	**		0.500	ND	II .	
beta-BHC	**	11	п		0.900	ND	11	
delta-BHC	н	n .	н		0.600	ND	11	
gamma-BHC (Lindane)		н	11		1.00	ND	10	
Chlordane (tech)	tt		•		1.00	ND	"	
alpha-Chlordane	n	**	*		0.800	ND	n	
gamma-Chlordane	0		**		0.700	ND	н	
4.4'-DDD	•	••	••		1.00	ND		
4,4'-DDE		••	11		1.00	ND	"	
4.4'-DDT	•1	n			1.00	ND		
Dieldrin	n	11	11		2.00	ND		
Endosulfan I	11	••	**		1.00	ND		
ndosulfan II	**	11	16		2.00	ND	' п	-
Endosulfan sulfate	11	11	*1		1.00	ND		. ~ ~
Endrin	"	"	**		2.00	ND	n	-
Endrin aldehyde	u	n	••		2.00	ND	"	
Heptachlor	11	"	н		1.00	ND		
Heptachlor epoxide	**	**	11		1.00	ND	n	
Methoxychlor	11	"			4.00	ND	U	
Toxaphene	**	u .	**		50.0	ND	11	
Aroclor 1016	н	н	H		50.0	ND	••	
Aroclor 1221		11	H.		50.0	ND	"	
Aroclor 1232	**	"	**		50.0	ND	11	
Aroclor 1242	11	**	n		50.0	ND	"	
Aroclor 1248		n	"		50.0	ND	н	
Aroclor 1254	"	••	••		50.0	ND		
Aroclor 1260	•	11			50.0	ND	,,	
Aroclor 1262	"	"	"		50.0	ND ND		
Aroclor 1268	n	"	ч		50.0	ND	H	
Surrogate: TCX	,,	"	"	40.0-130		85.5		

iorth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: (

Carlotta Cellucci

Reported: 9/25/98 13:58

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-PW1-SS-01			B8084	11-05			<u>Soil</u>	<u>2</u>
Aldrin	0880705	8/25/98	9/22/98		1.00	ND	ug/kg dry	
alpha-BHC	H	н	н		0.500	ND	11	
beta-BHC	Ħ	н	н		0.900	ND	**	
delta-BHC	Ħ	11	11		0.600	ND	11	
gamma-BHC (Lindane)	H	**	11		1.00	ND		
Chlordane (tech)	"	**	"		1.00	ND	i+	
alpha-Chlordane	n .	**	n		0.800	ND	11	
gamma-Chlordane	11	**	н		0.700	ND	Ħ	
4,4'-DDD	19	**	н		1.00	2.29	11	
4,4'-DDE	10	**	"		1.00	3.25	11	
4,4'-DDT	19	**	9/23/98		1.00	7.99		
Dieldrin	14	"	9/22/98		2.00	ND	**	
Endosulfan I	n .	••	· ·		1.00	ND	p	
Endosulfan II	II .	**	n		2.00	ND	**	
Endosulfan sulfate	14	**	••		1.00	ND	11	
Endrin	10	**	"		2.00	ND	11	
Endrin aldehyde	16	н	n		2.00	ND	н	
Heptachlor	11	11	11		1.00	ND	**	
Heptachlor epoxide	H .	**	н		1.00	ND	**	
Methoxychlor	10	н .	1*		4.00	ND	11	
Toxaphene	11	н	"		50.0	ND	H.	
Aroclor 1016	**	"	n		50.0	ND	10	
Aroclor 1221	19	n	**		50.0	ND		
Aroclor 1232	14	u			50.0	ND	D.	
Aroclor 1242	**	u ·	**		50.0	ND	**	
Aroclor 1248	н	••	n		50.0	ND	ar .	
Aroclor 1254	ti .	11	"		50.0	ND	"	
Aroclor 1260	**	11	*1		50.0	ND	н	
Aroclor 1262		11	"		50.0	ND	•	
Aroclor 1268			••		50.0	ND	"	
Surrogate: TCX	"	n	" .	40.0-130		88.5	%	

North Creek Analytical - Bothell





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Tetra Tech, Inc.

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project: Project Number: 10022-03

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes'
8-19-98-BIL-TP1-SS-01			B8084	11-06			<u>Soil</u>	<u>2,3</u>
Aldrin	0880705	8/25/98	9/22/98	<del></del>	21.0	ND	ug/kg dry	
alpha-BHC	11	"	r,		10.5	ND	"	
beta-BHC	"		••		18.9	ND	"	
delta-BHC	"	••	"		12.6	ND	11	
gamma-BHC (Lindane)	<b>"</b>	"			21.0	ND	**	
Chlordane (tech)	**	••			21.0	ND	ti.	
alpha-Chlordane	**	**	**		16.8	ND		
gamma-Chlordane	н	11	••		14.7	ND	n .	
4,4'-DDD	· ·	**	9/23/98		101	3060	11	
4,4'-DDE	n	н	**	-	101	1830	11	
4,4'-DDT	0	**	**		101	9520	u .	
Dieldrin	n .	n	9/22/98		42.0	ND	н	
Indosulfan I	II.	"			21.0	ND	H	
hdosulfan II	0	H	*1		42.0	ND	1f	
Endosulfan sulfate	29	11	**		21.0	ND	11	
Endrin	n	11	**		42.0	ND	**	
Endrin aldehyde	н	n	11		42.0	ND		
Heptachlor	н	11	**		21.0	ND	er .	
Heptachlor epoxide	11		н		21.0	ND		
Methoxychlor	II.		11		84.0	ND	**	
Toxaphene	n	•			1050	ND	II .	
Aroclor 1016	11	H	**		1050	ND	п	•
Aroclor 1221	11	"			1050	ND	**	
Aroclor 1232	"	п	n		1050	ND	"	
Aroclor 1242	**	11	•		1050	ND	rı .	
Aroclor 1248	rı	ŋ	n		1050	ND	11	
Aroclor 1254	11	"	"		1050	ND		
Aroclor 1260	u	n	"		1050	2250	đ	
Aroclor 1262	н	11	**		1050	ND	e	
Aroclor 1268	1T	11	**		1050	ND	14	
Surrogate: TCX	"	"	,,	40.0-130		78.7	%	

orth Creek Analytical - Bothell





PORTLAND • (503) 906-9200 • FAX 906-9210

8/21/98

Tetra Tech, Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98 600 University St., Suite 800 Project Number: 10022-03 Received:

Seattle, WA 98101 9/25/98 13:58 Project Manager: Carlotta Cellucci Reported:

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP2-SS-01			B8084	L1-07			<u>Soil</u>	2,3
Aldrin	0880705	8/25/98	9/22/98	<del></del>	11.0	ND	ug/kg dry	
alpha-BHC	11	н	**		5.50	ND	"	
beta-BHC	**	11			9.90	ND	"	
delta-BHC	· ·	н	н		6.60	ND	"	
gamma-BHC (Lindane)	11	tr	"		11.0	ND	••	
Chlordane (tech)	**	ŧi			11.0	ND	n	
alpha-Chlordane	n .	19			8.80	ND	"	
gamma-Chlordane	11	**	**		7.70	ND		
4.4´-DDD	"	н			11.0	ND	"	
4.4'-DDE	"	"	11		11.0	ND	"	
4.4´-DDT`	**	•1	**		11.0	ND	••	
Dieldrin	п	n			22.0	ND	"	
Endosulfan I	"	"	11		11.0	ND	"	
ndosulfan II	*1	n			22.0	ND	•	
Endosulfan sulfate	11	ıı .	11		11.0	ND		
Endrin	"	•	n		22.0	ND	"	
Endrin aldehyde		11	**		22.0	ND		
Heptachlor	"	"			11.0	ND	"	
Heptachlor epoxide	, w	••	11		11.0	ND	n	
Methoxychlor	**	11	н		44.0	ND	n	
Toxaphene	**	•	**		550	ND	u	
Aroclor 1016		"	**		550	ND		
Aroclor 1221	•	п	D		550	ND	n	
Aroclor 1232	0	"			550	ND	**	
Aroclor 1242	11	n	••		550	ND	**	
Aroclor 1248	· ·	••	"		550	ND	н	
Aroclor 1254	17	"	"		550	ND		
Aroclor 1260					550	ND	**	
Aroclor 1262	u	**			550	ND	11	
Aroclor 1268	h	n	"		550	ND	•	
Surrogate: TCV	"	"	"	40.0-130	<u>-</u>	56.2	%	

orth Creek Analytical - Bothell





PORTLAND • (503) 906-9200 • FAX 906-921

Tetra Tech. Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP4-SS-01			B8084	11-08			<u>Soil</u>	<u>2</u>
Aldrin	0880705	8/25/98	9/22/98		1.00	ND	ug/kg dry	
alpha-BHC	н	н	"		0.500	ND	"	
beta-BHC	11	"	*		0.900	ND	II .	
delta-BHC	н	**	n		0.600	ND	ų	
gamma-BHC (Lindane)	н	n	D		1.00	ND	••	
Chlordane (tech)	. "	"	**		1.00	ND	n	
alpha-Chlordane	ŋ	**	ti		0.800	ND	n .	
gamma-Chlordane	ч	**	•		0.700	ND	n	
4.4′-DDD	н	**	**		1.00	ND	n	
4.4′-DDE	n	**	11		1.00	ND	n	
4.4'-DDT	**	"	**		1.00	ND	н	
Dieldrin	n	"	н		2.00	ND	"	
Endosulfan I	"	11	"		1.00	ND.	H	
Endosulfan II	n	"	"	•	2.00	ND	"	
Endosulfan sulfate	n	"	**		1.00	ND	п	
Endrin	n	*1	"		2.00	ND	"	
Endrin aldehyde	n	••	н		2.00	ND	11	
Heptachlor	n	**	11		1.00	ND	н	
Heptachlor epoxide	n	**	11		1.00	ND	11	
Methoxychlor	H	**	**		4.00	ND	n .	
Toxaphene	n	,,	"		50.0	ND	н	
Aroclor 1016	н		**		50.0	ND	**	
Aroclor 1221	**	н	11		50.0	ND	**	
Aroclor 1232	n	"	H		50.0	ND		
Aroclor 1242	11	**	"		50.0	ND	r	
Aroclor 1248	н	**	**		50.0	ND	11	
Aroclor 1254	n	n	**		50.0	ND	n	
Aroclor 1260	n	**	*1		50.0	ND	н	
Aroclor 1262	11	"	u		50.0	ND	**	
Aroclor 1268	<b>"</b>	**	•		50.0	ND	11	
Surrogate TCX	"	"	n	40.0-130		132	%	4

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defining

Joy B Chang. Project Manager



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle. WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/25/98 13:58

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-01			B8084	11-09			<u>Soil</u>	<u>2,3</u>
Aldrin	0880705	8/25/98	9/22/98		21.0	ND	ug/kg dry	
alpha-BHC	n	н			10.5	ND	,,	
beta-BHC	**	"	н		18.9	ND	**	
delta-BHC	H	"	11		12.6	ND	**	
gamma-BHC (Lindane)	•	"	··		21.0	ND	**	
Chlordane (tech)	n	0	*		21.0	ND	U	
alpha-Chlordane	"	11	**		16.8	ND	n	
gamma-Chlordane	n	11	"		14.7	ND	**	
4.4'-DDD	n	U			21.0	ND	**	
4,4'-DDE	u		n		21.0	ND		
4.4'-DDT	n	"	n		21.0	ND	19	
Dieldrin	**		**		42.0	ND	· ·	
Endosulfan I	n	"	H		21.0	ND	**	
ndosulfan II	n	n	**		42.0	ND	н	
Endosulfan sulfate	11	**	11		21.0	ND	11	
Endrin	"	**	н		42.0	ND	"	
Endrin aldehyde	**	**	**		42.0	ND	п	
Heptachlor	**	••	•		21.0	ND	"	
Heptachlor epoxide	**	11	**		21.0	ND	••	
Methoxychlor	п	0	"		84.0	ND	H	
Toxaphene	11	**			1050	ND	**	
Aroclor 1016		**	••		1050	ND	n	
Aroclor 1221	u	11			1050	ND	**	
Aroclor 1232	"	**	"		1050	ND		
Aroclor 1242	n	п	11		1050	ND	"	
Aroclor 1248	n	н	n		1050	ND	**	
Aroclor 1254	**		**		1050	ND	" '	
Aroclor 1260	н	n	n		1050	ND	•	
Aroclor 1262	•	"	"		1050	ND	**	
Aroclor 1268	u	н	n		1050	ND	"	
Surrogate TCX	"	,, -	"	40.0-130		NR	%	5

orth Creek Analytical - Bothell





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Tetra Tech. Inc.

Project: Bradford Island Landfill 10022-03

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

Carlotta Cellucci

Received: 8/21/98 Reported: 9/25/98 13:58

Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02			B8084)	11-10			<u>Soil</u>	2
Aldrin	0880705	8/25/98	9/22/98		1.00	ND	ug/kg dry	_
alpha-BHC	H	**	17		0.500	ND	"	
beta-BHC	II .	•	**		0.900	ND	II .	
delta-BHC	11	• • • • • • • • • • • • • • • • • • • •	n		0.600	ND	U	
gamma-BHC (Lindane)	"	•	R		1.00	ND	••	
Chlordane (tech)	"	•	11		1.00	ND	"	
alpha-Chlordane	"	*1	11		0.800	ND	"	
gamma-Chlordane	n	"	"		0.700	ND	n	
4.4'-DDD	"	11			1.00	ND	**	
4.4'-DDE	"	D	er		1.00	ND	"	
4.4'-DDT	**		tr .		1.00	ND		
Dieldrin	"	11	••		2.00	ND	n	
Endosulfan I	"		**		1.00	ND	H	
Endosulfan II	•		**		2.00	ND	· ·	(
Endosulfan sulfate	•	11	,,		1.00	ND	"	
Endrin	•	•	**		2.00	ND	**	
Endrin aldehyde	п		**		2.00	ND	"	
Heptachlor	11	"			1.00	ND	**	
Heptachlor epoxide	11	**	ts		1.00	ND	"	
Methoxychlor		" .	••		4.00	ND	н	
Toxaphene	n	11	••		50.0	ND	н	
Aroclor 1016	H .		**		50.0	ND	ti .	
Aroclor 1221			+1		50.0	ND	n	
Aroclor 1232	"		**		50.0	ND	n	
Aroclor 1242			••		50.0	ND	n	
Aroclor 1248	**	n .	n		50.0	ND	•	
Aroclor 1254	а	H			50.0	ND	**	
Aroclor 1260	•				50.0	ND	"	
Aroclor 1262	**	•	n		50.0	ND	n	
Aroclor 1268	11	**	U		50.0	ND	"	
Surrogate: TCX	n	"	"	40.0-130		70.8	%	**

North Creek Analytical - Bothell





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Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

Carlotta Cellucci

Received: 8/21/98

9/25/98 13:58 Reported:

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-B1L-TP5-SS-01			B8084	11-11			<u>Soil</u>	<u>2,3</u>
Aldrin	0880705	8/25/98	9/22/98	<del></del>	21.0	ND	ug/kg dry	
alpha-BHC	11		••		10.5	ND	"	
beta-BHC	11		••		18.9	ND	"	
delta-BHC	"	**	"		12.6	ND.	"	
gamma-BHC (Lindane)	11	n	**		21.0	ND	rı	
Chlordane (tech)	n	"	**		21.0	ND	"	
alpha-Chlordane	"	"	ti		16.8	ND	"	
gamma-Chlordane	**	H	**		14.7	ND	**	
4.4´-DDD	n		**		21.0	ND	"	
4.4'-DDE	n	**	11		21.0	ND	"	
4.4´-DDT		11	**		21.0	ND	n	
Dieldrin	11		н		42.0	ND	"	
Endosulfan I	11		**		21.0	ND	**	
ndosulfan II	**	*1	**		42.0	ND	**	
Endosulfan sulfate	н	**	tt		21.0	ND	**	
Endrin	н	1+	**		42.0	ND	**	
Endrin aldehyde	11	••	n		42.0	ND	n	
Heptachlor	H	**	••		21.0	ND	"	
Heptachlor epoxide	••	•	11		21.0	ND	н	
Methoxychlor	n	••	**		84.0	ND	**	
Toxaphene	••	n .	n		1050	ND	"	
Aroclor 1016	u	••	••		1050	ND	17	
Aroclor 1221	**	**	**		1050	ND	**	
Aroclor 1232	••	H	u		1050	ND	"	
Aroclor 1242	•	**	**		1050	ND	••	
Aroclor 1248	**	н			1050	ND	**	
Aroclor 1254	11	"			1050	ND	11	
Aroclor 1260	11	**	**		1050	ND	· ·	
Aroclor 1262	11	u	"		1050	ND	11	
Aroclor 1268		"	10		1050	ND	**	
Surrogate: TCX		••	,,	40.0-130	····	NR	<del></del>	5

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Charg, Project Manage



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: C

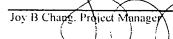
Carlotta Cellucci

Reported: 9/25/98 13:58

### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	·		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01			B8084	11-12			Soil	<u>2</u>
Aldrin	0880705	8/25/98	9/22/98	<del></del>	1.00	ND	ug/kg dry	
alpha-BHC	**	11	"		0.500	ND	"	
beta-BHC	n	"	"		0.900	ND	n	
delta-BHC	11	н			0.600	ND	*	
gamma-BHC (Lindane)	n	н	**		1.00	ND		
Chlordane (tech)	11				1.00	ND	"	
alpha-Chlordane	n	**	**		0.800	ND	н	
gamma-Chlordane	**	"	••		0.700	ND	11	
4.4′-DDD	D	**			1.00	ND	н	
4.4'-DDE	u	н	H		1.00	ND	11	
4.4´-DDT	**	**	"		1.00	ND	11	
Dieldrin	"	11	**		2.00	ND	н	
Endosulfan I	"	41			1.00	ND	"	
Endosulfan II	н	"	10		2.00	ND	н	(
Endosulfan sulfate	n	н	•		1.00	ND	**	
Endrin	11	н	n		2.00	ND	11	
Endrin aldehyde	п	**			2.00	ND	11	
Heptachlor	**	**	11		1.00	ND	**	
Heptachlor epoxide	11	"	н		1.00	ND		
Methoxychlor	"	**	**		4.00	ND	**	
Toxaphene	19	н	"		50.0	ND	**	
Aroclor 1016	n	**	n .		50.0	ND	11	
Aroclor 1221	'n	**			50.0	ND	"	
Aroclor 1232	"	**			50.0	ND	11	
Aroclor 1242	19	н	"		50.0	ND	н	
Aroclor 1248	**		11		50.0	ND		
Aroclor 1254	"	•	н		50.0	ND	n	
Aroclor 1260	11	**	**		50.0	ND	"	
Aroclor 1262	п	Ħ	n		50.0	ND	11	
Aroclor 1268	11	**			50.0	ND	**	
Surrogate: TCX	"	,,	••	40.0-130		82.2	%	

North Creek Analytical - Bothell





Tetra Tech, Inc.

Seattle. WA 98101

600 University St., Suite 800

BOTHELL • (425) 420-9200 • FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND = (503) 906-9200 = FAX 906-9210

Sampled:

8/17/98 to 8/20/98

Project Number: 10022-03 8/21/98 Received:

9/25/98 13:58 Project Manager: Carlotta Cellucci Reported:

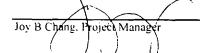
### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

Bradford Island Landfill

Project:

1	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP7-SS-01			B8084	11-13			Soil	<u>2,3</u>
Aldrin	0880705	8/25/98	9/22/98		51.0	ND	ug/kg dry	
alpha-BHC	н	п	n		25.5	ND		
beta-BHC	ų	11	н		45.9	ND	**	
delta-BHC	15	"	**		30.6	ND	rr	
gamma-BHC (Lindane)	**	11			51.0	ND	н	
Chlordane (tech)	**	••	**		51.0	ND	11	
alpha-Chlordane	11	15	•		40.8	ND	**	
gamma-Chlordane	19		"		35.7	ND	ti .	
4.4'-DDD	n		**		51.0	ND	U	
4.4´-DDE	"	н	**		51.0	ND	н	
4.4´-DDT	R	**	11		51.0	ND	11	
Dieldrin	**	н	**	•	102	ND	н	
Endosulfan I	**	**	P9		51.0	ND	11	
ndosulfan II	**	н	••		102	ND	**	
Endosulfan sulfate	**	n	**		51.0	ND	**	
Endrin	"	••			102	ND	11	
Endrin aldehyde	ti	11	•		102	ND	11	
Heptachlor	,,	II .	**		51.0	ND	••	
Heptachlor epoxide	"	11	"		51.0	85.1	·#	
Methoxychlor	"	"	"		204	ND	"	
Toxaphene	"	H	••		2550	ND	**	
Aroclor 1016	11	11	"		2550	ND	**	
Aroclor 1221	11	11	н		2550	ND	n	
Aroclor 1232	ii .	H	**		2550	ND	н	
Aroclor 1242	11		u		2550	ND	m .	
Aroclor 1248	H	D	11		2550	ND	11	
Aroclor 1254	n	11	••		2550	ND	**	
Aroclor 1260	••	n .	**		2550	ND		
Aroclor 1262	n	II .	U.		2550	ND	н	
Aroclor 1268	"	"	"		2550	ND	"	
Surrogate: TCX	"	"	••	40.0-130		NR	%	5

rth Creek Analytical - Bothell





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Tetra Tech, Inc.

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Project:

Carlotta Cellucci

9/25/98 13:58 Reported:

## Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP9-SS-01			B8084	<u>11-14</u>			<u>Soil</u>	2,3
Aldrin	0880705	8/25/98	9/22/98		21.0	ND	ug/kg dry	
alpha-BHC	. н	**	u		10.5	ND	n	
beta-BHC	н	**	"		18.9	ND	tr.	
delta-BHC	н	**	**		12.6	ND	н	
gamma-BHC (Lindane)	н	11	"		21.0	ND	**	
Chlordane (tech)	n	11			21.0	ND	11	
alpha-Chlordane	"		"		16.8	ND		
gamma-Chlordane	,,	**	n .		14.7	ND	ti	
4.4′-DDD	"	н	"		21.0	ND	**	
4.4'-DDE	"	"	**		21.0	ND	н	
4.4'-DDT	••	**	**		21.0	ND	**	
Dieldrin	"	••	**		42.0	ND	n	
Endosulfan I	"	**	**		21.0	ND		
Endosulfan II	n	17	n		42.0	ND		(i
Endosulfan sulfate	"	n .			21.0	ND	"	
Endrin	"	н	••		42.0	ND	•	
Endrin aldehyde	"	"	**		42.0	ND		
Heptachlor	•	"	"		21.0	ND	**	
Heptachlor epoxide	**	••	n		21.0	ND	**	
Methoxychlor	··	**	"		84.0	ND	u	
Toxaphene	•	,	••		1050	ND	•	
Aroclor 1016	**	n	••		1050	ND		
Aroclor 1221	"	,,	n		1050	ND	•	
Aroclor 1232	"	"			1050	ND	•	
Aroclor 1242	u	**	**		1050	ND	n	
Aroclor 1248	••	19	**		1050	ND	**	
Aroclor 1254	•	"	**		1050	ND	"	
Aroclor 1260		*1	••		1050	ND	н	
Aroclor 1262	11	**			1050	ND	•	
Aroctor 1268	"	11	••		1050	ND	n	
Surrogate TCX	"	"	"	40.0-130		NR	%	5

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and define

Joy B Chang. Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton, OR 97008-7132



PORTLAND \* (503) 906-9200 \* FAX 906-9210

Tetra Tech, Inc. 600 University St., Suite 800 Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager: Carlotta Cellucci Received: 8/21/98 Reported: 9/25/98 13:58

### Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-17-98-BIL-SB1-SS-01			DONO.4	f t - 0.1			<u>Soil</u>	
2.4-D	0880759	8/26/98	<u>B8084</u> 9/2/98	<u>11-01</u>	5.00	ND	ug/kg dry	
2.4-DB	"	0/20/90	9/2/90 #		20.0	ND ND	ug/kg ury	
2.4.5-T	11	tr.			20.0	ND	11	
2.4.5-TP (Silvex)	**	11	,,		20.0	ND	**	
Dalapon	н .	.,	,,		<b>8</b> 0.0	ND	н	6
Dicamba	n	,,	11		5.00	ND	**	•
Dichlorprop	"				15.0	ND	19	
Dinoseb	н	ti.			45.0	ND	10	3
MCPA	"	"	,,		750	ND	**	3
MCPP		••	,,		750 750	ND	11	
		<del></del>		21.0.126	730	<u>81.3</u>		
Surrogate: 2,4-DCAA				31.0-136		81.3	%	
8-19-98-BIL-PW1-SS-01			B8084	<u>11-05</u>			<u>Soil</u>	
4-D	0880759	8/26/98	9/2/98		5.00	ND	ug/kg dry	
2.4-DB	"	"	**		20.0	ND	"	
2.4,5-T	n	n	**		20.0	ND	**	
2.4.5-TP (Silvex)	n .	"			20.0	ND		
Dalapon	n	**	••		80.0	ND	11	6
Dicamba	11	11	••		5.00	ND	17	
Dichlorprop		•			15.0	ND	n	
Dinoseb	"	н			45.0	ND		3
MCPA	н	**	19		750	ND	11	·
MCPP	n	11	**		750	ND	"	
Surrogate: 2.4-DCAA	··· — — · · · · · · · · · · · · · · · ·		·	31.0-136		74.1	%	
9 10 00 DH TD1 CC 01			<b>D</b> 0004	11.00			6.3	
8-19-98-BIL-TP1-SS-01 2.4-1)	0000750	9/27/09	B80841	11-06	5.00	MIN	<u>Soil</u>	
2.4-DB	0880759	8/26/98	9/3/98			ND	ug/kg dry	
		"	,,		20.0	ND	"	
2.4.5-T	11	"	11		20.0	ND	"	
2.4.5-TP (Silvex)		"	"		20.0	ND		,
Dalapon	"	"	"		80.0	ND	"	6
Dicamba	"	"	"		5.00	ND	"	
Dichlorprop	"	"			15.0	ND		_
Dinoseb .	"	"	"		45.0	ND	"	3
MCPA			"		750	ND	•	
MCPP	11	H	**		750	ND		
Surrogate: 2.4-DCAA	"	"	"	31.0-136		56.2	%	

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang Project Manager



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 Received: 8/21/98

8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci

Reported: 9/25/98 13:58

### Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

BROBATI-TP2-SS-01		Batch	Date	Date	Surrogate	Reporting			
2.4-D	Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
2.4-D	9.10.09 RH TD2 CC A1			D00044	1.07			So:t	
2.4-DB		0880750	8/26/09		L1-U/	5.00	ND		
2.4,5-TP (Silvex)  2.4,5-TP (Silvex)  2.4,5-TP (Silvex)  2.0, ND  2.0, ND  2.2,5-TP (Silvex)  2.0, ND  2.1, S-TP (Silvex)  2.1, S-TP (Silvex)  2.1, S-TP (Silvex)  2.2, S-TP (Silvex)  2.2, S-TP (Silvex)  2.3, S-TP (Silvex)  2.4, S									
2.4.5-TP (Silvex)									
Dalapon " " " " 5.00 ND " 6 Dicamba " " 5.00 ND " Dichlotprop " " 15.0 ND " Dinoseb " 15.0 ND " 3 MCPA 15.0 ND " 3 MCPA 5.00 ND " 5.00 N	• •	**		ıı				**	
Dicamba         "         "         "         15.00         ND         "           Dichlorprop         "         "         "         15.00         ND         "           Dinoseb         "         "         "         45.00         ND         "           MCPA         "         "         "         750         ND         "           MCPA         "         "         "         750         ND         "           Surrogate: 2.4-DCA4         "         "         "         31,0-136         ND         "           Surrogate: 2.4-DCA4         "         "         "         31,0-136         ND         "           Surrogate: 2.4-DCA4         "         "         "         \$3,00-136         ND         "           Surrogate: 2.4-DCA4         "         "         "         \$00         ND         "           2.4-D         "         "         "         \$00         ND         "           2.4-D         "         "         "         \$00         ND         "           2.4-ST         "         "         "         \$00         ND         "           Dichlorprop <t< td=""><td></td><td>11</td><td>0</td><td>п</td><td></td><td></td><td></td><td></td><td>6</td></t<>		11	0	п					6
Dichlorprop         """" """ ""	•	•		19				**	V
Dinoseb  """" 750 ND "" 750 ND ""  MCPP """ 31.0-136 75.3 %  8-19-98-BIL-TP4-SS-01 2.4-DD 0880759 8/26/98 9/3/98 5.00 ND " 2.4-DB """ 20.0 ND " 2.4-5-TP (Silvex) """ 20.0 ND "  Dicholoprop """ 20.0 ND "  Dicholoprop """ 20.0 ND "  Dicholoprop """ 20.0 ND "  2.4-DB 20.0 ND "  2.4-S-TP (Silvex) """ 20.0 ND "  Dicholoprop """ 20.0 ND "  Dicholopr		Ħ		tr.					
MCPA         """"""""""""""""""""""""""""""""""""		•	**	0				**	3
MCPP         "         "         "         31.0-136         ND         "           Surrogate: 2.4-DCAA         "         "         "         31.0-136         ND         "           8-19-98-BIL-TP4-SS-01         B808411-08         Soil         Soil           2.4-DB         "         "         20.0         ND         "           2.4-DB         "         "         20.0         ND         "           2.4.5-T         "         "         20.0         ND         "           2.4.5-TP (Silvex)         "         "         20.0         ND         "           Dalapon         "         "         "         80.0         ND         "         6           Dicamba         "         "         "         5.00         ND         "         6           Dichlorprop         "         "         "         45.0         51.2         "         3           MCPA         "         "         "         750         ND         "           Surrogate: 2.4-DCA.4         "         "         "         80.136         ND         "           Surrogate: 2.4-DCA.5         "         "         "		"	**	11				•	-
Surrogate: 2.4-DCAA	MCPP	"	•	"				"	
2.4-D	Surrogate: 2.4-DCAA	·	- <del></del>		31.0-136			%	
2.4-D	8_10_08_R11_TD4 CC 01			DOGGA	1.09			So:I	
2.4-DB		0880750	8/26/00		<u>.1-00</u>	5.00	ИD		12
2.4.5-T									
2.4.5-TP (Silvex)									
Dalapon		u .							
Dicamba		H	•	11					6
Dichlorprop " " " " " 15.0 ND " 3 MCPA 45.0 51.2 " 3 MCPA 750 ND " MCPP 750 ND " 3 MCPA 750 ND " 750 N		н	"	11				"	U
Dinoseb       " " " " " " 750 ND "         MCPA       " " " " 31.0-136       750 ND "         MCPP       " " 31.0-136       54.2 %         8-20-98-BIL-TP6-SS-01       B808411-09       Soil         2.4-D       0880759       8/26/98       9/3/98       5.00 ND ug/kg dry         2.4-DB       " " " " 20.0 ND "       " 22.4.5-T       20.0 ND "         2.4.5-TP (Silvex)       " " " " " 20.0 ND "       ND "         Dalapon       " " " " " " " 5.00 ND "       ND "         Dicamba       " " " " " " 15.0 ND "         Dichlorprop       " " " " " " 15.0 ND "         Dinoseb       " " " " " 750 ND "         MCPA       " " " " " " " 750 ND "		н	,,	11				"	
MCPA " " " " " " " " " " " " " " " " " " "		**							3
MCPP " " " " 31.0-136		**	11	11					5
Surrogate: 2,4-DCAA	MCPP		11	10					
2.4-D       0880759       8/26/98       9/3/98       5.00       ND       ug/kg dry         2.4-DB       "       "       "       20.0       ND       "         2.4.5-T       "       "       "       20.0       ND       "         2.4.5-TP (Silvex)       "       "       "       20.0       ND       "         Dalapon       "       "       "       80.0       ND       "       6         Dicamba       "       "       "       15.0       ND       "         Dichlorprop       "       "       "       15.0       ND       "         Dinoseb       "       "       "       750       ND       "         MCPA       "       "       "       750       ND       "         MCPP       "       "       "       750       ND       "	Surrogate: 2,4-DCAA	,	· · · · · · · · · · · · · · · · · ·	ñ · · · · ·	31.0-136			%	
2.4-D       0880759       8/26/98       9/3/98       5.00       ND       ug/kg dry         2.4-DB       "       "       "       20.0       ND       "         2.4.5-T       "       "       "       20.0       ND       "         2.4.5-TP (Silvex)       "       "       "       20.0       ND       "         Dalapon       "       "       "       80.0       ND       "       6         Dicamba       "       "       "       15.0       ND       "         Dichlorprop       "       "       "       15.0       ND       "         Dinoseb       "       "       "       750       ND       "         MCPA       "       "       "       750       ND       "         MCPP       "       "       "       750       ND       "	8-20-98-BH-TP6-SS-01			<b>₽2</b> 0241	1-09			Soil	
2.4-DB	2.4-D	0880759	8/26/98		<u>-</u>	5.00	ND		
2.4.5-T       " " " " 20.0 ND "         2.4.5-TP (Silvex)       " " " 80.0 ND "         Dalapon       " " " 80.0 ND "         Dicamba       " " " " 15.0 ND "         Dichlorprop       " " " 15.0 ND "         Dinoseb       " " " 750 ND "         MCPA       " " " " 750 ND "         MCPP       " " " " 750 ND "	2.4-DB								
2.4.5-TP (Silvex) " " " " 80.0 ND " 6 Dialapon " " " " 80.0 ND " 6 Dicamba " " " " 5.00 ND "  Dichlorprop " " " 15.0 ND "  Dinoseb " " " " 10.0 ND "  MCPA " " " 750 ND "  MCPP " " 750 ND "		**	11	H					
Dalapon         " " " " " 5.00 ND " 6           Dicamba         " " " 5.00 ND "           Dichlorprop         " " " 15.0 ND "           Dinoseb         " " " 750 ND "           MCPA         " " " " 750 ND "		"	•	n					
Dicamba         " " " 5.00 ND "           Dichlorprop         " " " 15.0 ND "           Dinoseb         " " " 10.0 ND "           MCPA         " " " 750 ND "           MCPP         " " " " 750 ND "		"		n				n	6
Dichlorprop         " " " " 15.0 ND "           Dinoseb         " " " 10.0 ND "           MCPA         " " " 750 ND "           MCPP         " " " 750 ND "	Dicamba	н	**	**					v
Dinoseb       " " " " 10.0 ND "         MCPA       " " " 750 ND "         MCPP       " " " 750 ND "		ti	IF.	n				11	
MCPA " " " 750 ND " MCPP " 750 ND "	• •	**	n	n				н	
MCPP " " " 750 ND "	MCPA	•	**	u				11	
	MCPP	11	n	11					
	Surrogate. 2.4-DCAA	"	"	n	31.0-136	7.50	79.0	%	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin.

Joy B Chang, Plojec Manager

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Tetra Tech. Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

### Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			<del></del>
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02			B8084	11-10			Soil	
2.4-D	0880759	8/26/98	9/3/98		5.00	ND	ug/kg dry	
2.4-DB	•	**	**	4	20.0	ND	"	
2.4,5-T	11	**	"		20.0	ND	**	
2.4,5-TP (Silvex)	n	11	**		20.0	ND		
Dalapon	11	**	11		80.0	ND	11	6
Dicamba	"	**	**		5.00	ND	D	
Dichlorprop	**		**		15.0	ND	II .	
Dinoseb		••	"		45.0	ND	**	3
MCPA	"	11	**		750	ND	11	
MCPP	**	**	••		750	ND	**	
Surrogate: 2,4-DCAA	"	. ,,	· "	31.0-136		72.5	<del></del>	
8-20-98-BIL-TP5-SS-01			B8084	11-11			<u>Soil</u>	
.4-D	0880759	8/26/98	9/3/98	·	5.00	ND	ug/kg dry	
2.4-DB	"	"	"		20.0	ND	11	
2.4,5-T		**	11		20.0	ND	н	
2.4.5-TP (Silvex)	••	•	**		20.0	ND	"	
Dalapon	"		и		80.0	ND	**	6
Dicamba	"	.,	**		5.00	ND	11	
Dichlorprop	"	"	**		15.0	ND		
Dinoseb	**		**		10.0	ND	н	
MCPA	•	**	**		750	ND	10	
МСРР		**			750	ND	•	
Surrogate: 2,4-DCAA	"	" ·	,	31.0-136		85.4	%	
8-20-98-BIL-TP8-SS-01			B80841	11-12			<u>Soil</u>	
2.4-D	0880759	8/26/98	9/3/98		5.00	ND	ug/kg dry	
2.4-DB		"	n		20.0	ND	"	
2.4.5-T	**	r	,,		20.0	ND	18	
2.4.5-TP (Silvex)		"	•		20.0	ND	**	
Dalapon	••	u	11		80.0	ND	,,	6
Dicamba	••				5.00	ND	"	=
Dichlorprop	11	11	•		15.0	ND	п	

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Surrogate, 2.4-DCAA

Dinoseb

**MCPA** 

**MCPP** 

\*Refer to end of report for text of notes and definitions.

ND

ND

ND

58.0

10.0

750

750



31.0-136



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Tetra Tech, Inc.

Project: Br

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101 Project Number:

10022-03

Received: 8/21/98 Reported: 9/25/98 13:58

Project Manager: (

Carlotta Cellucci

## Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP7-SS-01			<u>B8084</u>	11-13			<u>Soil</u>	
2.4-D	0880759	8/26/98	9/3/98	<del></del>	5.00	ND	ug/kg dry	
2.4-DB	,,	"	11		20.0	ND	"	
2.4.5-T	n	"	"		20.0	ND	,,	
2.4.5-TP (Silvex)	**	**	н		20.0	ND	11	
Dalapon	"	**	"		80.0	ND	11	6
Dicamba	**	**	11		5.00	ND	11	
Dichlorprop	**	"	n		15.0	ND	ti .	
Dinoseb		**			10.0	ND	n	
MCPA		**	**		750	ND	n	
MCPP	"	**	**		750	ND	•	
Surrogate: 2,4-DCAA	,	"	,,	31.0-136		71.1	%	
8-20-98-BIL-TP9-SS-01			<u>B8084</u>	11-14			<u>Soil</u>	
2.4-D	0880759	8/26/98	9/3/98		5.00	ND	ug/kg dry	(
2.4-DB		**	••		20.0	ND	"	
2.4.5-T		**	**		20.0	ND	n	
2.4.5-TP (Silvex)	**	"	n		20.0	ND	н	
Dalapon	••	н	**		80.0	ND	n	6
Dicamba	••		11		5.00	ND	"	
Dichlorprop		**	11		15.0	ND	•	
Dinoseb	u .	**	н		10.0	ND	H	
MCPA	••	n	**		750	ND	"	
MCPP		•	"		750	ND	"	
Surrogate: 2,4-DCAA	"		,,	31.0-136		83.1	%	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Charg. Project Manager



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Sampled: 8/17/98 to 8/20/98

Received: 8/21/98 Reported: 9/25/98 13:58

Tetra Tech, Inc.Project:Bradford Island LandfillSampled:600 University St., Suite 800Project Number:10022-03Received:Seattle, WA 98101Project Manager:Carlotta CellucciReported:

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-17-98-B1L-SB1-SS-01			B8084	11-01			Soil	
Acetone	0880906	8/31/98	8/31/98	<u></u>	2.00	ND	mg/kg dry	
Benzene	"	"	"		0.100	ND	"	
Bromobenzene	n	n	"		0.100	ND		
Bromochloromethane	n	n	,,		0.100	ND	11	
Bromodichloromethane	n	**	n		0.100	ND	11	
Bromoform	n	**	"		0.100	ND	,,	
Bromomethane	l)	н	n		0.100	ND	**	
2-Butanone	U	••	11		2.00	ND	**	
n-Butylbenzene	n	н	**		0.100	ND	**	
sec-Butylbenzene	п	**			0.100	ND	н	
tert-Butylbenzene	11		•		0.100	ND	**	
Carbon disulfide	"	u	11		0.100	ND	"	
Carbon tetrachloride	·	**	17		0.100	ND	ч	
hlorobenzene	"	11			0.100	ND	••	
Chloroethane	ti	**	11		0,100	ND	11	
Chloroform	н	11	"		0.100	ND	"	
Chloromethane	•	u	n		0.500	ND	11	
2-Chlorotoluene	TF.	11	"		0.100	ND	11	
4-Chlorotoluene	D.	••	"		0.100	ND	••	
Dibromochloromethane		**	**		0.100	ND	n	
1.2-Dibromo-3-chloropropane	**	••	"		1.00	ND		
1.2-Dibromoethane	•	"	ŧ)		0.100	ND	n	
Dibromomethane		,,	tr		0.100	ND	**	
1.2-Dichlorobenzene		n	••		0.100	ND		
1.3-Dichlorobenzene	11	**	n		0.100	ND	•	
1.4-Dichlorobenzene		•			0.100	ND	"	
Dichlorodifluoromethane	••	•			0.100	ND	"	
1.1-Dichloroethane	п	**			0.100	ND	11	
1.2-Dichloroethane	**	••	**		0.100	ND	••	
1.1-Dichloroethene	"	**			0.100	ND		
cis-1.2-Dichloroethene	11	**	••		0.100	ND		
trans-1.2-Dichloroethene	**	н			0.100	ND	11	
1.2-Dichloropropane	n	11	**		0.100	ND	п	
1.3-Dichloropropane	"	"	n		0.100	ND	11	
2.2-Dichloropropane	n	**	"		0.100	ND	n	
1.1-Dichloropropene	n	ч			0.100	ND		
cis-1.3-Dichloropropene	••	••			0.100	ND	••	
trans-1,3-Dichloropropene		11	"		0.100	ND	,,	

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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/25/98 13:58

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-17-98-BIL-SB1-SS-01 (continued)			B8084	11-01			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	8/31/98	<del></del>	0.100	ND	mg/kg dry	
Hexachlorobutadiene	"	"	11		0.100	ND	, ,	
2-Hexanone	••	**	11		2.00	ND	11	
lsopropylbenzene	11	**	u .		0.100	ND	и	
p-Isopropyltoluene	**	**			0.100	ND	п	
Methylene chloride	n	•	"		1.00	ND	11	
4-Methyl-2-pentanone	"	**			2.00	ND	н	
Naphthalene	n .	**	"		0.100	ND	11	
n-Propylbenzene	11		U		0.100	ND		
Styrene		11	n		0.100	ND	**	
1.1.1.2-Tetrachloroethane	н	"	,,		0.100	ND	п	
1.1.2.2-Tetrachloroethane		**	n		0.100	ND	u	
Tetrachloroethene	**	**	**		0.100	ND		
Toluene	•	*1		•	0.100	ND	"	( )
1.2.3-Trichlorobenzene	n	•	"		0.100	ND	u .	$\sim$
1.2.4-Trichlorobenzene	и,	n	11		0.100	ND	11	
1.1.1-Trichloroethane	n	••	**		0.100	ND	•	
1.1.2-Trichloroethane	н	•	"		0.100	ND	н	
Trichloroethene	n	••	"		0.100	ND	**	
Trichlorofluoromethane	n	"	· ·		0.100	ND	"	
1.2.3-Trichloropropane		**	"		0.100	ND	•	
1.2.4-Trimethylbenzene	lr.	n	"		0.100	ND	n	
1.3.5-Trimethylbenzene	n .	••	"		0.100	ND	**	
Vinyl chloride	n .	**	11		0.100	ND	n	
m.p-Xylene	н	**	er e		0.200	ND	"	
o-Xylene	**	"	**		0.100	ND		
Surrogate: 2-Bromopropene	"	"	"	70.0-130	·-	82.1	%	
Surrogate: 1.2-DCA-d4	"	"	"	70.0-130		94.0	"	
Surrogate: Toluene-d8	"	"	"	70.0-130		90.2	#	
Surrogate: 4-BFB	**	••	"	70.0-130		92.3	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang, Project Manage



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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			., .
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
0 10 00 DH DW1 CC 01			D0004	11.05			<u>Soil</u>	
8-19-98-BIL-PW1-\$S-01	000000	0/21/00	<u>B8084</u>	11-05	2.00	ND	mg/kg dry	
Acetone	0880906	8/31/98	8/31/98		0.100	ND	mg/kg dry	
Benzene					0.100	ND		
Bromobenzene		 n	,,			ND ND	**	
Bromochloromethane	,		,,		0.100 0.100	ND ND	п	
Bromodichloromethane							11	
Bromoform	"	"	,,		0.100	ND	,,	
Bromomethane	"	"	))		0.100	ND		
2-Butanone	,,	u	"		2.00	ND		
n-Butylbenzene	•				0.100	ND		
sec-Butylbenzene	н	**	**		0.100	ND		
tert-Butylbenzene	н	n	"		0.100	ND	"	
Carbon disulfide	11	**	n		0.100	ND		
Carbon tetrachloride	н	"	"		0.100	ND	10	
hlorobenzene	11		" .		0.100	ND	an an an an an an an an an an an an an a	
Chloroethane	u	н	"		0.100	ND	"	
Chloroform	"	**	"		0.100	ND	11	•
Chloromethane	*	11	"		0.500	ND	11	
2-Chlorotoluene	"		"		0.100	ND	II.	
4-Chlorotoluene	н	n	"		0.100	ND	e)	
Dibromochloromethane	н	•	**		0.100	ND	r	
1.2-Dibromo-3-chloropropane	11	**	"		1.00	ND	șt.	
1.2-Dibromoethane	н	r)			0.100	ND		
Dibromomethane	"	11	. "		0.100	ND	ri	
1.2-Dichlorobenzene	n	p	n		0.100	ND	11	
1.3-Dichlorobenzene	"	**	•		0.100	ND	tt.	
1.4-Dichlorobenzene	н	n	**		0.100	ND	"	
Dichlorodifluoromethane	n .		H		0.100	ND		
1.1-Dichloroethane	n	**	39		0.100	ND	**	
1.2-Dichloroethane	н		п		0.100	ND	11	
1.1-Dichloroethene	n	11	**		0.100	ND		
cis-1.2-Dichloroethene					0.100	ND	,,	
trans-1,2-Dichloroethene	н	Įį.	11		0.100	ND	•	
	11	11	п		0.100	ND	11	
1.2-Dichloropropane	n .	11	**		0.100	ND ND	•	
1.3-Dichloropropane		,,	D.		0.100	ND ND	"	
2.2-Dichloropropane		,,					"	
1.1-Dichloropropene	"	"	"		0.100	ND		
cis-1.3-Dichloropropene	"	"	"		0.100	ND	n	
trans-1,3-Dichloropropene	"	"	,,		0.100	ND	**	

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Bradford Island Landfill Project:

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number:

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	-		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-PW1-SS-01 (continued)			B8084	<u>11-05</u>			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	8/31/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	**	и	"		0.100	ND	"	
2-Hexanone	11		••		2.00	ND	"	
Isopropylbenzene	**	н	••		0.100	ND	11	
p-lsopropyltoluene	н	н	**		0.100	ND	н	
Methylene chloride	H	n	,,		1.00	ND	н	
4-Methyl-2-pentanone	ti	н	"		2.00	ND	"	
Naphthalene	**	"	"		0.100	ND	,	
n-Propylbenzene	ti	"	**		0.100	ND	·i	
Styrene	**	**	**		0.100	ND	"	
1.1.1,2-Tetrachloroethane	••	•	••		0.100	ND		
1.1.2.2-Tetrachloroethane	••	**	**		0.100	ND	**	
Tetrachloroethene	**	**	**		0.100	ND	n	
Toluene	11	"			0.100	ND	n	(1)
1.2,3-Trichlorobenzene	**	н	t+		0.100	ND	п	
1.2,4-Trichlorobenzene	**	**	o o		0.100	ND	n	
1.1.1-Trichloroethane	"	"			0.100	ND		
1.1.2-Trichloroethane	н	**	••		0.100	ND	11	
Trichloroethene	••	**	••		0.100	ND	н	
Trichlorofluoromethane	**	" .	.,		0.100	ND		
1.2.3-Trichloropropane	**		**		0.100	ND	н	
1.2.4-Trimethylbenzene	"	ы	tı		0.100	ND	••	
1.3.5-Trimethylbenzene	11	n	*1		0.100	ND	н	
Vinyl chloride		н	**		0.100	ND	11	
m.p-Xylene	и	**	II .		0.200	ND	"	
o-Xylene		**	н		0.100	ND	n .	
Surrogate: 2-Bromopropene	"	. "		70.0-130		78.2	%	
Surrogate: 1,2-DCA-d4	"	"	"	70.0-130		88.7	"	
Surrogate: Toluene-d8	"	"	"	70.0-1 <b>3</b> 0		91.6	,,	
Surrogate: 4-BFB	,,	"	"	70.0-130		89.5	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

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PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

Project:

Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager: Carlotta Cellucci

10022-03

Received: 8/21/98

9/25/98 13:58 Reported:

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			<b>N</b> 1 .
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes
8-19-98-BIL-TP1-SS-01			B8084	11-06			<u>Soil</u>	
Acetone	0880906	8/31/98	8/31/98		2.00	ND	mg/kg dry	
Benzene	"	"	"		0.100	ND	"	
Bromobenzene	н		11		0.100	ND		
Bromochloromethane	"	"	11		0.100	ND	11	
Bromodichloromethane	n		**		0.100	ND	11	
Bromoform	11	14	н		0.100	ND	n	
Bromomethane	**	••	**		0.100	ND	Ir	
2-Butanone	"		**		2.00	ND		
n-Butylbenzene	**	11	11		0.100	ND	•	
sec-Butylbenzene	n	u	,,		0.100	ND	•	
tert-Butylbenzene	"	H	**		0.100	ND	n	
Carbon disulfide	"	"	н		0.100	ND	n	
Carbon tetrachloride	11		11		0.100	ND	11	
hlorobenzene	"	**	н		0.100	ND	**	
Chloroethane	"	н	**		0.100	ND	н	
Chloroform	**	11	**		0.100	ND	н	
Chloromethane	**	**	н		0.500	ND	11	
2-Chlorotoluene	10		11		0.100	ND	tr.	
4-Chlorotoluene			п		0.100	ND	н	
Dibromochloromethane	**	**	11		0.100	ND	**	
1.2-Dibromo-3-chloropropane	**	••	**		1.00	ND	11	
1.2-Dibromoethane	**	**			0.100	ND	11	
Dibromomethane	"		11		0.100	ND	11	
1.2-Dichlorobenzene	•	••	**		0.100	ND	**	
1.3-Dichlorobenzene	11	**	11		0.100	ND	n	
1.4-Dichlorobenzene	н	18	11		0.100	ND	**	
Dichlorodifluoromethane	0	н			0.100	ND	••	
1.1-Dichloroethane	.,	••			001.0	ND		
1.2-Dichloroethane	•		**		0.100	ND	n	
1.1-Dichloroethene	•				0.100	ND	,,	
cis-1.2-Dichloroethene					0.100	ND	н	
trans-1.2-Dichloroethene	,,	н	**		0.100	ND	11	
	"	**	19		0.100	ND ND	11	
1.2-Dichloropropane	"		.,		0.100	ND ND	11	
1.3-Dichloropropane	**	.,			0.100	ND.	н	
2,2-Dichloropropane	**				0.100	ND.	11	
1.1-Dichloropropene							"	
cis-1.3-Dichloropropene	,	.,			0.100	ND	n	
rans-1.3-Dichloropropene	••	••			0.100	ND		

orth Creek Analytical - Bothell





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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci Received: 8/21/98 Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP1-SS-01 (continued)			B8084	<u>11-06</u>			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	8/31/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	11	rr .	•		0.100	ND	"	
2-Hexanone	11	**	"		2.00	ND	**	
Isopropylbenzene	**		•		0.100	ND	11	
p-IsopropyItoluene	••	.,	0		0.100	ND	11	
Methylene chloride	11		11		1.00	ND	11	
4-Methyl-2-pentanone	11	n	n .		2.00	ND	11	
Naphthalene	11	**			0.100	ND	11	
n-Propylbenzene	11				0.100	ND	**	
Styrene	11		**		0.100	ND	11	
1.1.1.2-Tetrachloroethane	11	"			0.100	ND	"	
1.1.2.2-Tetrachloroethane	11	"			0.100	ND	"	
Tetrachloroethene	11		••		0.100	ND	"	
Toluene	11	n	11		0.100	ND	"	(
1.2.3-Trichlorobenzene	14		11		0.100	ND	n	
1.2.4-Trichlorobenzene	10		•		0.100	ND	"	
1.1.1-Trichloroethane	u	**	10		0.100	ND	"	
1.1.2-Trichloroethane	tt	n	10		0.100	ND	"	
Trichloroethene	u		••		0.100	ND	н	
Trichlorofluoromethane	¥1	**	••		0.100	ND	n	
1.2.3-Trichloropropane	**	••	**		0.100	ND	11	
1.2.4-Trimethylbenzene	11	**	••		0.100	ND	**	
1.3.5-Trimethylbenzene	**	н	*		0.100	ND	D.	
Vinyl chloride	•	**			0.100	ND	"	
m.p-Xylene	11	*1	•		0.200	ND	**	
o-Xylene	17	. "	"		0.100	ND	"	
Surrogate 2-Bromopropene	"	n	"	70.0-130		62.4	%	7
Surrogate: 1.2-DCA-d4	"	,,	"	70.0-130		77.2	"	
Surrogate Toluene-d8	"	"	"	70.0-130		71.4	"	
Surrogate: 4-BFB	,,	"	"	70.0-130		68.2	"	7

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin.

Joy B Chang, Project Manager

18939 120th Avenue N E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S W. Nimbus Avenue, Beaverton, OR 97008-7132



Tetra Tech. Inc.

Seattle, WA 98101

600 University St., Suite 800

BOTHELL • (425) 420-9200 • FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND • (503) 906-9200 • FAX 906-9210

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03 Received: 8/21/98

Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

Bradford Island Landfill

Project:

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP2-SS-01			<u>B80841</u>	1_07			<u>Soil</u>	
Acetone	0880906	8/31/98	9/1/98	<u> </u>	2.00	ND	mg/kg dry	
Benzene	0880906	8/31/98 "	9/1/98 "		0.100	ND ND	mg/kg dry	
Bromobenzene	н		**		0.100	ND ND	н	
Bromochloromethane	**	н	er e		0.100	,ND ND	n	
Bromodichloromethane	**	"	* **		0.100	ND ND	,,	
Bromoform	,,	"	11		0.100	ND ND		
Bromomethane	**	11			0.100	ND ND		
2-Butanone	11	u	n		2.00	ND ND	**	
n-Butylbenzene	11	n	11		0.100	ND ND	н	
sec-Butylbenzene		n			0.100	ND ND	н	
tert-Butylbenzene	11	"	н		0.100	ND ND	н	
Carbon disulfide	"	11	"		0.100	ND ND		
Carbon disuffide  Carbon tetrachloride		"					••	
arbon tetrachioride hlorobenzene		"	"		0.100	ND ND	"	
Chlorocthane	"	n	"		0.100	ND ND	"	_
Chloroform	"	"			0.100	ND ND		-
	"	"	,,		0.100	ND	"	•
Chloroteluana	"	"	"		0.500	ND ND	"	
2-Chlorotoluene		"	n		0.100	ND	"	
4-Chlorotoluene	"	"	"		0.100	ND	"	
Dibromochloromethane	"	"	"		0.100	ND	"	
1.2-Dibromo-3-chloropropane		"	"		1.00	ND	"	
1.2-Dibromoethane	"	"	"		0.100	ND	"	
Dibromomethane	и	"	"		0.100	- ND	"	
1.2-Dichlorobenzene		"	"		0.100	ND		
1.3-Dichlorobenzene	" N	"	"		0.100	ND	н	
1.4-Dichlorobenzene		"			0.100	ND		
Dichlorodifluoromethane			"		0.100	ND		
1.1-Dichloroethane			"		0.100	ND		
1.2-Dichloroethane		11	**		0.100	ND	н .	
1.1-Dichloroethene	и	"	"		0.100	ND		
cis-1.2-Dichloroethene	••	н	"		0.100	ND	Ir	
trans-1,2-Dichloroethene	"	"	"		0.100	ND	11	
1.2-Dichloropropane	"	**	"		0.100	ND	**	
1.3-Dichtoropropane	"	"	"		0.100	ND	n	
2.2-Dichloropropane	11	11	"		0.100	ND	**	
1.1-Dichloropropene	п	**	"		0.100	ND	**	
cis-1.3-Dichloropropene	"	11	и		0.100	ND		
trans-1,3-Dichloropropene	**	"	"		0.100	ND	**	

orth Creek Analytical - Bothell



<sup>\*</sup>Refer to end of report for text of notes and definitions.



PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech. Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

9/25/98 13:58 Reported:

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP2-SS-01 (continued)			B8084	l 1-07			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	"	0	**		0.100	ND	"	
2-Hexanone	"	•	••		2.00	ND	**	
Isopropylbenzene	**	n	••		0.100	ND	**	
p-Isopropyltoluene	**	"	••		0.100	ND	**	
Methylene chloride	"	н			1.00	ND	11	
4-Methyl-2-pentanone		н	**		2.00	ND	11	
Naphthalene	"	**			0.100	ND	u	
n-Propylbenzene	••	н	••		0.100	ND	**	
Styrene	"	H	**		0.100	ND	¥I	
1.1.1.2-Tetrachloroethane	••	10	••		0.100	ND	**	
1.1.2.2-Tetrachloroethane	••	11			0.100	ND	•	
Tetrachloroethene	**	**	**		0.100	ND	n	
Toluene	•	n	11		0.100	ND	n	
1.2.3-Trichlorobenzene	"	11	**		0.100	ND	•	$\sim$
1.2.4-Trichlorobenzene	"	11	11		0.100	ND	"	
1.1.1-Trichloroethane	"	11			0.100	ND	r	
1.1.2-Trichloroethane		**	**		0.100	ND		
Trichloroethene		"	P		0.100	ND	"	
Trichlorofluoromethane	"				0.100	ND	"	
1.2.3-Trichloropropane	"	**			0.100	ND	n	
1.2.4-Trimethylbenzene	u .	11	**		0.100	ND	u	
1.3.5-Trimethylbenzene		n	,,		0.100	ND	п	
Vinyl chloride	••				0.100	ND	11	
m.p-Xylene	"	н	U		0.200	ND	•	
o-Xylene	H.	11	ţ1		0.100	ND		
Surrogate: 2-Bromopropene		"	"	70.0-130		87.8	-%	
Surrogate: 1.2-DCA-d4	"	"	"	70.0-130		93.9	"	
Surrogate: Toluene-d8	"	,,	<b>"</b> .	70.0-130		91.3	"	
Surrogate: 4-BFB	,,	n	•	70.0-130		92.6	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definit

ect Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery. Suite B. Spokane, WA 99206-4776 9405 S.W Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		·	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
•								
8-19-98-BIL-TP4-SS-01			<u>B8084</u>	<u>11-08</u>			<u>Soil</u>	•
Acetone	0880906	8/31/98	9/1/98		2.00	ND	mg/kg dry	
Benzene	"	"	"		0.100	ND	11	
Bromobenzene	11	"	н		0.100	ND	···	
Bromochloromethane	н	18	"		0.100	ND	н	
Bromodichloromethane	,,	11	"		0.100	ND	11	
Bromoform	11	**	n		0.100	ND	**	
Bromomethane	**	D	"	•	0.100	ND	tr	
2-Butanone	**		**		2.00	ND	**	
n-Butylbenzene	••	•	**		0.100	ND	**	
sec-Butylbenzene	n	н	•		0.100	ND	и	
tert-Butylbenzene	11	**	н		0.100	ND	**	
Carbon disulfide	••	•	"		0.100	ND	"	
Carbon tetrachloride			tr.		0.100	ND	"	
hlorobenzene	**	**	11		0.100	ND	**	
Chloroethane	D	"	•		0.100	ND	11	
Chloroform	п		н		0.100	ND	"	
Chloromethane	"	•	**		0.500	ND	11	
2-Chlorotoluene	"	**	н		0.100	ND	**	
4-Chlorotoluene	· ·	••	51		0.100	ND	11	
Dibromochloromethane	"	u	n		0.100	ND	"	
1.2-Dibromo-3-chloropropane	•		•		1.00	ND	"	
1.2-Dibromoethane	•	11			0.100	ND	"	
Dibromomethane	**	**			0.100	ND	п	
1.2-Dichlorobenzene	11	•	11		0.100	ND	н	
1.3-Dichlorobenzene	16	••	11		0.100	ND	11	
1.4-Dichlorobenzene			**		0.100	ND	**	
Dichlorodifluoromethane	**	**	11		0.100	ND	н	
1.1-Dichloroethane	••	**			0.100	ND	н	
1,2-Dichloroethane		o o	11		0.100	ND	"	
1.1-Dichloroethene	**	**	•		0.100	ND	,,	
cis-1.2-Dichloroethene	•		11		0.100	ND ND	11	
trans-1.2-Dichloroethene	,,	,,			0.100	ND ND	n	
1.2-Dichloropropane	n .	**	u u		0.100	ND	n	
1.3-Dichloropropane	,,	н	II.		0.100		II.	
2.2-Dichtoropropane	"	11			0.100	ND		
		,,				ND		
1.1-Dichloropropene			••		0.100	ND	"	
cis-1.3-Dichloropropene	.,	"	.,		0.100	ND		
trans-1.3-Dichloropropene		,,	.,		0.100	ND	. <b>"</b>	

orth Creek Analytical - Bothell





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Tetra Tech, Inc.

Seattle, WA 98101

600 University St., Suite 800

Project: Project Number: Project Manager:

Bradford Island Landfill

10022-03

Carlotta Cellucci

Sampled: 8/17/98 to 8/20/98

Received: 8/21/98

Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP4-SS-01 (continued)			B8084	11.00			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98	11-00	0.100	ND	mg/kg dry	
Hexachlorobutadiene	"	0/31/76	7/1/76		0.100	ND	mg/kg dry	
2-Hexanone		н			2.00	ND	11	
Isopropylbenzene	"	н	11		0.100	ND	**	
p-Isopropyltoluene	н	**	"		0.100	ND		
Methylene chloride	"	,,	**		1.00	ND	17	
4-Methyl-2-pentanone		H	**		2.00	ND	n	
Naphthalene		11	11		0.100	ND		
n-Propylbenzene		17			0.100	ND	**	
Styrene		**			0.100	ND		
1.1.1.2-Tetrachloroethane		ч			0.100	ND	m .	
1.1.2.2-Tetrachloroethane		**			0.100	ND	u	
Tetrachloroethene	11	11	11		0.100	ND	m .	
Toluene		**	**		0.100	ND	41	( )
1.2.3-Trichlorobenzene		**	••		0.100	ND	**	
1.2.4-Trichlorobenzene		11	•		0.100	ND	**	
1.1.1-Trichloroethane		"	••		0.100	ND		
1.1.2-Trichloroethane		**	**		0.100	ND	н	
Trichloroethene		**	••		0.100	ND		
Trichlorofluoromethane	.,	**	"		0.100	ND	11	
1.2.3-Trichloropropane	,,	"	n		0.100	ND	н	
1.2.4-Trimethylbenzene		н			0.100	ND	"	
1.3.5-Trimethylbenzene	n	н			0.100	ND	**	
Vinyl chloride	"	.,	"		0.100	ND	11	
m.p-Xylene		н	"		0.200	ND	11	
o-Xylene		н	*1		0.100	ND	**	
Surrogate: 2-Bromopropene	"	"	" · ··	70.0-130		87.1	%	-
Surrogate: 1,2-DCA-d4	"	"	"	70.0-130		97.1	"	
Surrogate: Toluene-d8	"	,,	"	70.0-130		92.9	"	
Surrogate: 4-BFB	"	"	"	70.0-130		90.0	,,	
The second secon				. 17.17-1 317		217.17		

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defini

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S W Nimbus Avenue, Beaverton, OR 97008-7132



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98
600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	_		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-01			B8084	11-09			<u>Soil</u>	
Acetone	0880906	8/31/98	9/1/98	<u> </u>	2.00	ND	mg/kg dry	
Benzene	н	"	"		0.100	ND	"	
Bromobenzene	•	D	**		0.100	ND	n	
Bromochloromethane	n	0			0.100	ND	11	
Bromodichloromethane	n '	н	"		0.100	ND	"	
Bromoform	u	11			0.100	ND	n	
Bromomethane	и	11	"		0.100	ND	H	
2-Butanone	"	n	"		2.00	ND	II .	
n-Butylbenzene	19	**	**		0.100	ND	11	
sec-Butylbenzene	ti .	**	••		0.100	ND	**	
tert-Butylbenzene		**	n		0.100	ND	н	
Carbon disulfide	"	n	H		0.100	ND	n	
Carbon tetrachloride	**	ч	"		0.100	ND	11	
hlorobenzene	**	**	n		0.100	ND	11	
Chloroethane	11	**	**		0.100	ND	н	•
Chloroform	**	n	**		0.100	ND	н	
Chloromethane	и .	••	•		0.500	ND	**	
2-Chlorotoluene	H	u	н		0.100	ND	U	
4-Chlorotoluene	H				0.100	ND	11	
Dibromochloromethane	н	ei .	•		0.100	ND	11	
1.2-Dibromo-3-chloropropane	н	"			1.00	ND	**	
1.2-Dibromoethane	11	11	**		0.100	ND	•	
Dibromomethane	11				0.100	ND	**	
1.2-Dichlorobenzene	n	U	11		0.100	ND	"	
1.3-Dichlorobenzene	"	н	**		0.100	ND		
1.4-Dichlorobenzene	n	•	u .		0.100	ND	U	
Dichlorodifluoromethane	**	n	•		0.100	ND	*	
1.1-Dichloroethane	H	н	•		0.100	ND	**	
1.2-Dichloroethane	п		"		0.100	ND	**	
1.1-Dichloroethene	H		•		0.100	ND	11	
cis-1,2-Dichloroethene	11	н			0.100	ND	11	
trans-1,2-Dichloroethene	*1	n	"		0.100	ND	**	
1.2-Dichloropropane		н	11		0.100	ND	11	
1.3-Dichloropropane	n	,,	**		0.100	ND	n	
2.2-Dichloropropane		н	u		0.100	ND	11	
1.1-Dichloropropene	0	"	"		0.100	ND	n	
cis-1.3-Dichloropropene			н		0.100	ND	н	
trans-1.3-Dichloropropene	**	11	••		0.100	ND	**	

orth Creek Analytical - Bothell

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Joy B Chang. Project Manager



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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager: 10022-03

Received: 8/21/98

Reported: 9/25/98 13:58

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

Carlotta Cellucci

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-01 (continued)			B8084	<u> 11-09</u>			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	*1	н	**		0.100	ND	11	
2-Hexanone	**	н	11		2.00	ND	11	
Isopropylbenzene	"	n	11		0.100	ND	н	
p-Isopropyltoluene	••	0	11		0.100	ND	· ·	
Methylene chloride		"	11		1.00	ND	н	
4-Methyl-2-pentanone	11				2.00	ND	"	
Naphthalene	**	"	н		0.100	0.139	n	
n-Propylbenzene	**	"	**		0.100	ND	11	
Styrene	**	**			0.100	ND	n	
1.1.1.2-Tetrachloroethane	11	"	**		0.100	ND	H .	
1.1.2.2-Tetrachloroethane	**	,,	•		0.100	ND	"	
Tetrachloroethene	11	11	••		0.100	ND	11	
Toluene	n		**		0.100	ND	It	(
1.2.3-Trichlorobenzene	н		ty.		0.100	ND	n	
1.2.4-Trichlorobenzene	. "	11	**		0.100	ND	II.	
1.1.1-Trichloroethane	11		n		0.100	ND	n	
1.1.2-Trichloroethane	11	11	ч		0.100	ND	**	
Trichloroethene	11	н	n		0.100	ND	н	
Trichlorofluoromethane	n		**		0.100	ND	*1	
1.2.3-Trichloropropane	n	"	11		0.100	ND	11	
1.2.4-Trimethylbenzene	n	••			0.100	ND	II .	
1.3.5-Trimethylbenzene	n	••			0.100	ND	н	
Vinyl chloride	n	"	"		0.100	ND	**	
m.p-Xylene	**	"	••		0.200	ND	"	
o-Xylene	,,	н	**		0.100	ND	"	
Surrogate: 2-Bromopropene	"	"	"	70.0-130		86.1	%	
Surrogate: 1.2-DCA-d4	"	"	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	70.0-130		<i>98.2</i>	"	
Surrogate: Toluene-d8	"	"	<b>,</b>	70.0-130		91.4	"	
Surrogate 4-BFB	"	,,	"	70.0-130		<b>90</b> . 7	,,	

North Creek Analytical - Bothell

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Joy B Chang.

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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02			B8084	11-10			Soil	
Acetone	0880906	8/31/98	9/1/98	<del> , <b>-</b> ×</del>	2.00	ND	mg/kg dry	
Benzene	"	"	"		0.100	ND	"	
Bromobenzene	n	n	11		0.100	ND		
Bromochloromethane	11	"	**		0.100	ND	11	
Bromodichloromethane	U	11	**		0.100	ND	H	
Bromoform	•	**	••		0.100	ND	"	
Bromomethane	II.				0.100	ND	"	
2-Butanone	"	•	11		2.00	ND	11	
n-Butylbenzene	n	11	•		0.100	ND	0	
sec-Butylbenzene		u	**		0.100	ND	n	
tert-Butylbenzene	"	**	n		0.100	ND	**	
Carbon disulfide	"	**	11		0.100	ND	n	
Carbon tetrachloride	"	11	"		0.100	ND	**	
hlorobenzene	n	**	**		0.100	ND	н	
Chloroethane	n	"	11		0.100	ND	" .	
Chloroform	0	11	••		0.100	ND	*1	
Chloromethane	"	"	**		0.500	ND	11	
2-Chlorotoluene	"	**	••		0.100	ND	"	
4-Chlorotoluene	n	**	**		0.100	ND	· #	
Dibromochloromethane			••		0.100	ND	**	
1.2-Dibromo-3-chloropropane	n	••	**		1.00	ND		
1.2-Dibromoethane	"	••	••		0.100	ND	n	
Dibromomethane	n	b	**		0.100	ND	**	
1.2-Dichlorobenzene	"	11	••		0.100	ND	"	
1.3-Dichlorobenzene	•	•	n		0.100	ND	H	
1.4-Dichlorobenzene	"	11	11		0.100	ND	11	
Dichlorodifluoromethane		14	"		0.100	ND	н	
1.1-Dichloroethane	"		II .		0.100	ND	18	
1.2-Dichloroethane	**	11	"		0.100	ND	17	
1.1-Dichloroethene	•	**	**		0.100	ND	"	
cis-1.2-Dichloroethene	u	n	н		0.100	ND	"	
trans-1,2-Dichloroethene	•	**			0.100	ND	o o	
1.2-Dichloropropane	••	**	••		0.100	ND	н	
1.3-Dichloropropane	•	"			0.100	ND	"	
2.2-Dichloropropane	**	•	"		0.100	ND-	n	
1.1-Dichloropropene	"	**			0.100	ND	**	
cis-1.3-Dichloropropene	•	"			0.100	ND	•	
trans-1.3-Dichloropropene	•				0.100	ND	11	

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Joy B Chang, Project Manager



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Tetra Tech, Inc.

Seattle, WA 98101

600 University St., Suite 800

Project: Project Number:

Project Manager:

Bradford Island Landfill

10022-03

Carlotta Cellucci

Sampled: 8/17/98 to 8/20/98

Received: 8/21/98

Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02 (continued)			B8084)	<u> 11-10</u>			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98	-	0.100	ND	mg/kg dry	
Hexachlorobutadiene	u .	н	11		0.100	ND	"	
2-Hexanone	n	н	II.		2.00	ND		
Isopropylbenzene	n	п	11		0.100	ND	••	
p-Isopropyltoluene	"	n	11		0.100	ND	"	
Methylene chloride		п	n		1.00	ND	n	
4-Methyl-2-pentanone	"	н	**		2.00	ND	u	
Naphthalene	n	**	v		0.100	ND	**	
n-Propylbenzene	"	H	**		0.100	ND	•	
Styrene	**	,,	n		0.100	ND	**	
1.1.1.2-Tetrachloroethane	11	"	11		0.100	ND	n	
1.1.2.2-Tetrachloroethane	11	11	н		0.100	ND	n	
Tetrachloroethene	n '	n	H		0.100	ND	n	
Toluene	II	n			0.100	ND		į.
1.2.3-Trichlorobenzene	ti	н	tr .		0.100	ND	U	
1.2.4-Trichlorobenzene		**			0.100	ND	11	
1.1.1-Trichloroethane	**	n	n		0.100	ND	11	
1.1.2-Trichloroethane	**	· ·	11		0.100	ND	u	
Trichloroethene	11	**	11		0.100	ND	n	
Trichlorofluoromethane	11	11	11		0.100	ND	II.	
1.2.3-Trichloropropane	11	**	"		0.100	ND	11	
1.2.4-Trimethylbenzene	n	u	··		0.100	ND	n	
1.3.5-Trimethylbenzene	ti	•	и		0.100	ND	H	
Vinyl chloride	H	**	11		0.100	ND	•	
m.p-Xylene	••	*1	н		0.200	ND	11	
o-Xylene	п	**	"		0.100	ND	н	
Surrogate: 2-Bromopropene	"	"		70.0-130		77.1	%	-
Surrogate: 1,2-DCA-d4		"	"	70.0-130		90.4	"	
Surrogate: Toluene-d8	"	"	"	70.0-130		85.7	"	
Surrogate: 4-BFB	"	"	•	70.0-130		84.1	"	

North Creek Analytical - Bothell

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Joy B Chang Project Manager



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

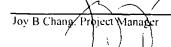
Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<del></del>	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP5-SS-01			B8084	11-11			<u>Soil</u>	
Acetone	0880906	8/31/98	9/1/98		2.00	ND	mg/kg dry	
Benzene	n	n	n		0.100	ND	"	
Bromobenzene	tr	••			0.100	ND	п	
Bromochloromethane	n	*1	**		0.100	ND	11	
Bromodichloromethane	11	o	"		0.100	ND	**	
Bromoform	**		••		0.100	ND	"	
Bromomethane	"	**	4		0.100	ND	н	
2-Butanone			•		2.00	ND	н	
n-Butylbenzene	11	11	59		0.100	0.422	и	
sec-Butylbenzene	"	II .	11		0.100	0.142	0	
tert-Butylbenzene	"	**	"		0.100	ND	"	
Carbon disulfide	n	**	**		0.100	ND	и	
Carbon tetrachloride	•				0.100	ND	н	
hlorobenzene	11	ŧŧ	10		0.100	ND	n	
Chloroethane	H	н	II .		0.100	ND	n	
Chloroform	11	**	11		0.100	ND	и	
Chloromethane	***	1f	**		0.500	ND		
2-Chlorotoluene	"	"	н		0.100	ND	"	
4-Chlorotoluene	11	н .	**		0.100	ND	н	
Dibromochloromethane		"	••		0.100	ND	н	
1.2-Dibromo-3-chloropropane	п	"	**		1.00	ND	n	1
1.2-Dibromoethane	"	••	U		0.100	ND	n	
Dibromomethane	n	н	11		0.100	ND	n	
1.2-Dichlorobenzene		"	•		0.100	ND	н	
1.3-Dichlorobenzene	п	n	н		0.100	ND	**	
1.4-Dichlorobenzene	••	TF.	**		0.100	ND	•	
Dichlorodifluoromethane	11	•	••		0.100	ND	n	
1.1-Dichloroethane	••	"	**		0.100	0.112	11	
1.2-Dichloroethane	"	n	"		0.100	ND	11	
1.1-Dichloroethene	**	Tr.	••		0.100	ND	11	
cis-1.2-Dichloroethene	п	"	•		0.100	ND	n	
trans-1.2-Dichloroethene	••	••	••		0.100	ND	"	
1.2-Dichloropropane	**	"	н		0.100	ND	н	
1.3-Dichloropropane	**	"	11		0.100	ND	Ħ	
2.2-Dichloropropane	"	n	"		0.100	ND	**	
1.1-Dichloropropene	**	"	11		0.100	ND	**	
eis-1,3-Dichloropropene	11	••	••		0.100	ND	11	
trans-1,3-Dichloropropene	"	"	4		0.100	ND	"	

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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Project Number:

Project: Bradford Island Landfill

10022-03

Project Manager: Carlotta Cellucci Sampled: 8/17/98 to 8/20/98

8/21/98 Received:

Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP5-SS-01 (continued)			B8084	11-11			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98		0.100	0.228	mg/kg dry	
Hexachlorobutadiene	••	•			0.100	ND	"	
2-Hexanone	•		**		2.00	ND	"	
Isopropylbenzene	n	•	и		0.100	ND	"	
p-Isopropyltoluene	**	**			0.100	0.314	"	
Methylene chloride	•	••	11		1.00	ND	•	
4-Methyl-2-pentanone	**	•	•		2.00	ND.	11	
Naphthalene	11	u u	•		0.100	0.333	н	
n-Propylbenzene	н	11			0.100	0.172	**	
Styrene	n		"		0.100	ND	11	
1.1.1.2-Tetrachloroethane	11	0	н		0.100	ND	11	
1.1.2.2-Tetrachloroethane	n	11	**		0.100	ND	н	
Tetrachloroethene	н	11	••		0.100	ND	**	
Toluene	"	tr	••		0.100	1.36	**	(
1.2,3-Trichlorobenzene	"	11	••		0.100	ND	"	$\sim$
1.2.4-Trichlorobenzene		п	••		0.100	ND	11	
1.1.1-Trichloroethane	н	11	**		0.100	ND	*1	
1.1.2-Trichloroethane	**	11	"		0.100	ND	11	
Trichloroethene	11	n	n		0.100	ND	Dr.	
Trichlorofluoromethane	n	H	"		0.100	ND	n	
1.2.3-Trichloropropane	н		•		0.100	ND	11	
1,2,4-Trimethylbenzene		11	••		0.100	1.46	n,	
1,3,5-Trimethylbenzene	"	n	"		0.100	0.570	*1	
Vinyl chloride	n		"		0.100	ND	11	
m,p-Xylene	n	••	11		0.200	0.631	n	
o-Xylene	H	"			0.100	0.269	**	
Surrogate: 2-Bromopropene	n	"	"	70.0-130		75.7	%	•
Surrogate: 1.2-DCA-d4	"	**	<i>"</i> .	70.0-130		91.8	"	
Surrogate: Toluene-d8	,,	"	"	70.0-130		85.2	n	
Surrogate: 4-BFB	,,	"	"	70.0-130		83.6	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang.

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Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager: Carlotta Cellucci

Received: 8/21/98

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### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01			B8084	11-12			<u>Soil</u>	
Acetone	0880906	8/31/98	9/1/98		2.00	ND	mg/kg dry	
Benzene	"	"	"		0.100	. ND	"	
Bromobenzene			н		0.100	ND	н	
Bromochloromethane	11	н	11		0.100	ND	11	
Bromodichloromethane	n ·	11	n		0.100	ND	v	
Bromoform	*1	н	**		0.100	ND	"	
Bromomethane	"	•	**		0.100	ND	11	
2-Butanone	11		11		2.00	ND	11	
n-Butylbenzene	**	"	n		0.100	ND	**	
sec-Butylbenzene	11	11	11		0.100	ND		
tert-Butylbenzene	**	••			0.100	ND	n	
Carbon disulfide	**	••	**		0.100	ND	"	
Carbon tetrachloride	••	n	"		0.100	ND	**	
îhlorobenzene	11				0.100	ND	**	
Chloroethane	n	н	11		0.100	ND	**	
Chloroform	11	"	н		0.100	ND	"	
Chloromethane	**	**	11		0.500	ND	11	
2-Chlorotoluene	11		•		0.100	ND	11	
4-Chlorotoluene		11	n		0.100	ND	n	
Dibromochloromethane	11		**		0.100	ND	"	
1.2-Dibromo-3-chloropropane	•	11	11		1.00	ND	н	
1.2-Dibromoethane		••	**		0.100	ND	"	
Dibromomethane	11	*1			0.100	ND	**	
1.2-Dichlorobenzene	n				0.100	ND	17	
1.3-Dichlorobenzene	•	"	**		0.100	ND		
1.4-Dichlorobenzene	n	•	"		0.100	ND	**	
Dichlorodifluoromethane	n	11			0.100	ND	**	
1.1-Dichloroethane	11	••	n .		0.100	ND	**	
1.2-Dichloroethane	n	11			0.100	ND	11	
1.1-Dichloroethene	н	**	10		0.100	ND	11	
cis-1,2-Dichloroethene	n	11			0.100	ND	**	
trans-1,2-Dichloroethene	11	**	11		0.100	ND	н	
1.2-Dichloropropane	· n	1)	,,		0.100	ND	н	
1.3-Dichloropropane	u	**	II		0.100	ND	**	
2.2-Dichloropropane	0	п	н		0.100	ND	н	
1.1-Dichloropropene	•	**	н		0.100	ND	п	
cis-1,3-Dichloropropene	"	II.	n .		0.100	ND	n	
trans-1,3-Dichloropropene		**	,,		0.100	ND	n	

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orth Creek Analytical - Bothell



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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Bradford Island Landfill Project:

Project Number:

Project Manager:

10022-03

Carlotta Cellucci

Sampled: 8/17/98 to 8/20/98

Received: 8/21/98

Reported: 9/25/98 13:58

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01 (continued)			B8084	11-12			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	"		"		0.100	ND	"	
2-Hexanone	н	n	· ·		2.00	ND	п	
Isopropylbenzene	н	11	**		0.100	ND	11	
p-Isopropyltoluene	н	п	**		0.100	ND	11	
Methylene chloride	н	**	•		1.00	ND	11	
4-Methyl-2-pentanone	н	п	11		2.00	ND	11	
Naphthalene	u .	•			0.100	ND	u .	
n-Propylbenzene	u	•	**		0.100	ND	11	
Styrene	н	n	11		0.100	ND	H	
1.1.1.2-Tetrachloroethane	**	11	,,		0.100	ND		
1.1.2.2-Tetrachloroethane	"	n	U		0.100	ND	**	
Tetrachloroethene	"		"		0.100	1.34	"	$\sim$
Toluene	••	n,	,,		0.100	ND	11	(
1.2.3-Trichlorobenzene	**	10	"		0.100	ND	"	<b>A</b>
1.2.4-Trichlorobenzene	••		"		0.100	ND	11	
1.1.1-Trichloroethane	**		**		0.100	ND	"	
1.1.2-Trichloroethane	u	**	14		0.100	ND	H	
Trichloroethene	•	ts			0.100	ND	n .	
Trichlorofluoromethane	P		n		0.100	ND	Ħ	
1.2.3-Trichloropropane		u			0.100	ND	**	
1.2.4-Trimethylbenzene	n -	••	••		0.100	ND	n	
1.3.5-Trimethylbenzene	**	"			0.100	ND	**	
Vinyl chloride		**	**		0.100	ND	**	
m.p-Xylene		11	**		0.200	ND	**	
o-Xylene		•			0.100	ND	n	
Surrogate. 2-Bromopropene	"	"	."	70.0-130		84.8	%	-
Surrogate: 1.2-DCA-d4	"	"	,,,	70.0-130		95.7	11	
Surrogate: Toluene-d8	"	n	"	70.0-130		92.6	"	
Surrogate: 4-BFB	"	"	"	70.0-130		90.9	**	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

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Sampled: 8/17/98 to 8/20/98

Tetra Tech. Inc. Project: Bradford Island Landfill

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	D 1.	1 Indian	NILA
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes
8-20-98-BIL-TP7-SS-01			B8084	<u>11-13</u>			<u>Soil</u>	
Acetone	0880906	8/31/98	9/1/98		2.00	ND	mg/kg dry	
Benzene	"	**	"		0.100	ND	11	
Bromobenzene	n	**	**		0.100	ND	"	
Bromochloromethane	n	**	•		0.100	ND	"	
Bromodichloromethane	"	u	"		0.100	ND	n	
Bromoform	H	••	•		0.100	ND	"	
Bromomethane	*1	**	"		0.100	ND	**	
2-Butanone	**	**	**		2.00	ND	**	
n-Butylbenzene	"	**	**		0.100	ND	n	
sec-Butylbenzene	**	te .	.,		0.100	ND	и	
tert-Butylbenzene	ii.	11	"		0.100	ND	**	
Carbon disulfide	•	ti	n		0.100	ND	**	
Carbon tetrachloride		11	11		0.100	ND	"	
hlorobenzene	**	•1	**		0.100	ND	11	
Chloroethane		19	**		0.100	ND	11	
Chloroform		h	**		0.100	ND	"	
Chloromethane	14	10	•		0.500	ND	n	
2-Chlorotoluene	**	11	**		0.100	ND	"	
4-Chlorotoluene	**	11			0.100	ND	"	
Dibromochloromethane	"	**			0.100	ND	**	
1.2-Dibromo-3-chloropropane	"	*1	•		1.00	ND	н	
1,2-Dibromoethane	11	"			0.100	ND	11	
Dibromomethane	11		n		0.100	ND	n	
1.2-Dichlorobenzene		11			0.100	ND	11	
1.3-Dichlorobenzene	,,	"			0.100	ND	11	
1.4-Dichlorobenzene	"	•,	,,		0.100	ND	н	
Dichlorodifluoromethane	"	10			0.100	ND	п	
1.1-Dichloroethane	••		**		0.100	ND	11	
1.2-Dichloroethane	"	••			0.100	ND	n	
1.1-Dichloroethene		n	••		0.100	ND	н	
cis-1.2-Dichloroethene	ıı .		**		0.100	ND		
rans-1.2-Dichloroethene	•	•			0.100	ND	**	
1.2-Dichloropropane	···	0	n		0.100	ND	n	
1.3-Dichloropropane	••	•			0.100	ND		
2.2-Dichloropropane		"			0.100	ND ND		
1.1-Dichloropropene	•	**	**		0.100	ND	11	
ris-1.3-Dichloropropene			•		0.100	ND ND	п	
rans-1.3-Dichloropropene	"		••		0.100	ND ND	н	

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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101 Project Number: 10022-03

Received: 8/21/98

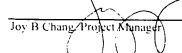
A 98101 Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	<del></del>		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP7-SS-01 (continued)			B8084	11.13			Soil	
Ethylbenzene	0880906	8/31/98	9/1/98	1.15	0.100	ND	mg/kg dry	
Hexachlorobutadiene	"	"	"		0.100	ND	"	
2-Hexanone	"	"	**		2.00	ND	"	
Isopropylbenzene	**	**	••		0.100	ND	r	
p-Isopropyltoluene	•	••	••		0.100	ND	,,	
Methylene chloride	**	,,	••		1.00	ND	**	
4-Methyl-2-pentanone	**				2.00	ND	**	
Naphthalene		,,	"		0.100	ND	14	
n-Propylbenzene	••	n			0.100	ND	11	
Styrene	**	P	**		0.100	ND	"	
1.1.1.2-Tetrachloroethane	••		"		0.100	ND	н	
1.1.2.2-Tetrachloroethane	**	**	"		0.100	ND	· ·	
Tetrachloroethene	n	••	"		0.100	2.12	**	
Toluene	"	**	··		0.100	ND	it.	<b>(</b>
1.2.3-Trichlorobenzene	**	**	"		0.100	ND	н	
1.2.4-Trichlorobenzene	п	**	11		0.100	ND		
1.1.1-Trichloroethane	n	**	••		0.100	ND	n	
1.1.2-Trichloroethane	••	•	**		0.100	ND	н	
Trichloroethene	•	"	"		0.100	ND	··	
Trichlorofluoromethane	••	••	"		0.100	ND	"	
1.2.3-Trichloropropane	**	•1	"		0.100	ND	11	
1.2.4-Trimethylbenzene	"	"	••		0.100	ND	n	
1.3.5-Trimethylbenzene		11	••		0.100	ND	**	
Vinyl chloride	"	"	**		0.100	ND	11	
m.p-Xylene	•	"	**		0.200	ND	**	
o-Xylene	•	. "	"		0.100	ND		
Surrogate 2-Bromopropene	"	"	"	70.0-130		89.4	%	
Surrogate, 1,2-DCA-d4	"	"	"	70 0-130		96.8	"	
Surrogate: Toluene-d8	"	"	"	70.0-130		95.4	"	
Surrogate: 4-BFB	"	"	"	70.0-130		93.5	"	

North Creek Analytical - Bothell





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Tetra Tech. Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled:

8/17/98 to 8/20/98 8/21/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

Carlotta Cellucci

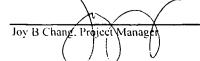
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## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP9-SS-01			B8084	L1-14			Soil	
Acetone	0880906	8/31/98	9/1/98	<del>.</del>	2.00	ND	mg/kg dry	•
Benzene	"	н	"		0.100	ND	"	
Bromobenzene	"	11	11		0.100	ND	•	
Bromochloromethane	n	n	It.		0.100	ND	n .	
Bromodichloromethane	11	н	n		0.100	ND	**	
Bromoform	"	11	н		0.100	ND	н	
Bromomethane		U	"		0.100	ND	**	
2-Butanone	n .	**	**		2.00	ND	n	
n-Butylbenzene	II.	11	II		0.100	0.146	"	
sec-Butylbenzene	n	II .	11		0.100	ND	••	
tert-Butylbenzene	n	"			0.100	ND	"	
Carbon disulfide	••	н	II.		0.100	ND	tt.	
Carbon tetrachloride	n	**	ñ		0.100	ND		
Chlorobenzene	n	n .	n		0.100	ND	11	
Chloroethane	d.	II .	11		0.100	ND	•	
Chloroform	n .	11	**		0.100	ND		
Chloromethane	**	**	n		0.500	ND	11	
2-Chlorotoluene	H	**	"		0.100	ND	u	
4-Chlorotoluene	"	n	н		0.100	ND	u	
Dibromochloromethane	**	11	11		0.100	ND	"	
1.2-Dibromo-3-chloropropane		"	11		1.00	ND	•	
1.2-Dibromoethane	e e	"	11		0.100	ND	**	
Dibromomethane	n	"	"		0.100	ND	"	
1.2-Dichlorobenzene	••	**	"		0.100	ND		
1.3-Dichlorobenzene	n	n	"		0.100	ND	и	
1.4-Dichlorobenzene	**	n	11		0.100	ND	"	
Dichlorodifluoromethane	"	"	n		0.100	ND	"	
1.1-Dichloroethane	••	n	"		0.100	ND	"	
1.2-Dichloroethane	••	It	**		0.100	ND	н	
1.1-Dichloroethene	"	"	11		0.100	ND	"	
cis-1.2-Dichloroethene	"	"	**		0.100	ND		
trans-1,2-Dichloroethene	"	"	"		0.100	ND	"	
1.2-Dichloropropane	11	11	m .		0.100	ND	"	
1.3-Dichloropropane	"	**	**		0.100	ND	H	
2.2-Dichloropropane	"	11			0.100	ND	"	
1.1-Dichloropropene	**	**	**		0.100	ND	**	
cis-1.3-Dichloropropene	n	"	II.		0.100	ND	•	
trans-1,3-Dichloropropene	"	"	"		0.100	ND	21	

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Tetra Tech. Inc. 600 University St., Suite 800 Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

10022-03 Project Number: Project Manager: Carlotta Cellucci

8/21/98 Received:

Reported: 9/25/98 13:58

Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP9-SS-01 (continued)			B8084	11-14			<u>Soil</u>	
Ethylbenzene	0880906	8/31/98	9/1/98		0.100	ND	mg/kg dry	
Hexachlorobutadiene	11	"			0.100	ND	"	
2-Hexanone	25	н	**		2.00	ND	n	
Isopropylbenzene	ti.	**	••		0.100	ND	"	
p-Isopropyltoluene	**	**	•		0.100	ND	и	
Methylene chloride	••	. **	**		1.00	ND	н	
4-Methyl-2-pentanone	**		н		2.00	ND	п	
Naphthalene	**	н			0.100	0.135	**	
n-Propylhenzene	11	n	**		0.100	ND	11	
Styrene	"	*1	**		0.100	ND	н	
1.1.1.2-Tetrachloroethane	**	•	11		0.100	ND	<b>"</b>	
1.1.2.2-Tetrachloroethane	**	11	**		0.100	ND	19	
Tetrachloroethene	••		••		0.100	ND .		
Toluene	**	**	11	•	0.100	1.12	11	
1.2.3-Trichlorobenzene	**	))	,,		0.100	ND	D	_
1.2.4-Trichlorobenzene	••	"	••		0.100	ND	n	
1.1.1-Trichloroethane	•1	11	••		0.100	ND	11	
1.1.2-Trichloroethane	**	н	••		0.100	ND	н	
Trichloroethene		••	•		0.100	ND	"	
Trichlorofluoromethane	n .	**	••		0.100	ND		
1.2.3-Trichloropropane		"	**		0.100	ND	**	
1,2.4-Trimethylbenzene	••	*1	.,		0.100	0.448	н	
1,3.5-Trimethylbenzene	**	" .	0		0.100	0.189	11	
Vinyl chloride		n	••		0.100	ND	п	
m.p-Xylene		11	••	•	0.200	ND	**	
o-Xylene	*1	tı			0.100	ND	11	
Surrogate: 2-Bromopropene	"	"	"	70 0-130		79.6	%	
Surrogate: 1.2-DCA-d4	"	"	"	70.0-130		92.8	n	
Surrogate Toluene-d8	"	"	"	~0.0-130		89.8	"	
Surrogate: 4-BFB	"	"	"	70.0-130		87.2	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defini

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Tetra Tech. Inc. 600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Received: 8/21/98 Reported: 9/25/98 13:58

## Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes'
8-17-98-BIL-SB1-SS-01			B8084	11-01			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		0.100	ND	mg/kg dry	
Acenaphthy lene	11	n	"		0.100	ND	"	
Aniline	••	n			0.100	ND	"	
Anthracene	н	•	н		0.100	ND	*	
Benzoic Acid		**	**		0.500	ND	••	
Benzo (a) anthracene	"	**	tr		0.100	ND	**	
Benzo (b) fluoranthene	11	•	н		0.100	ND		
Benzo (k) fluoranthene	**	н	n		0.100	ND	n	
Benzo (ghi) perylene	11	"	•		0.100	ND	"	
Benzo (a) pyrene	11	H	D		0.100	ND	н	
Benzyl alcohol	**	н	11		0.100	ND	"	
Bis(2-chloroethoxy)methane	**	"	n ´		0.100	ND	**	
Bis(2-chloroethyl)ether	11		**		0.100	ND	11	
sis(2-chloroisopropyl)ether	u.		11		0.100	ND	и	
Bis(2-ethylhexyl)phthalate	**	**	"		0.500	ND		
1-Bromophenyl phenyl ether	n	н	н		0.100	ND	n	
Butyl benzyl phthalate	II .				0.100	ND	U	
Carbazole	11	er e	**		0.500	ND	н	
-Chloroaniline	н	"	н		0.100	ND	н	
2-Chloronaphthalene	H.	10			0.100	ND	н	
4-Chloro-3-methylphenol	**	••	18		0.100	ND	**	
2-Chlorophenol	n	n	11		0.100	ND	**	
I-Chlorophenyl phenyl ether	••	11	"		0.100	ND		
Chrysene	n	••	11		0.100	ND	**	,
Dibenz (a.h) anthracene	n	**	п		0.100	ND	н	
Dibenzofuran	"	"	**		0.100	ND	н .	
Di-n-butyl phthalate	n	11	11		0.500	ND	,	
.3-Dichlorobenzene	n .	•	11		0.100	ND	"	
.4-Dichlorobenzene	"	"	*		0.100	ND	н	
.2-Dichlorobenzene	n	"	•		0.100	ND	н	
3'-Dichlorobenzidine	"	"	"		5.00	ND	"	
.4-Dichlorophenol	n	"	n		0.100	ND	H	
Diethyl phthalate		n	It		0.100	ND	II .	
.4-Dimethylphenol	**	n	ш		0.100	ND	"	
Dimethy I phthalate		"	11		0.100	ND	**	
.6-Dinitro-2-methylphenol		n	lt.		0.500	ND	11	
.4-Dinitrophenol	*1	n	11		0.500	ND	н	
.4-Dinitrotoluene	11	**	n		0.100	ND	n	

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\*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manage



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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Received: 8/21/98

Reported: 9/25/98 13:58

### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

·	Batch	Date	Date	Surrogate	Reporting			
Analyte.	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-17-98-BIL-SB1-SS-01 (continued)			B8084	11-01			Soil	
2,6-Dinitrotoluene	0880681	8/25/98	8/27/98		0.100	ND	mg/kg dry	
Di-n-octyl phthalate		"	11		0.500	ND		
Fluoranthene			"		0.100	ND	•	
Fluorene	"	н	**		0.100	ND	•	
Hexachlorobenzene	n				0.100	ND	н	
Hexachlorobutadiene	"	**	"		0.100	ND	11	
Hexachlorocyclopentadiene	n	ti .	ч		0.100	ND	**	
Hexachloroethane	н	O .	11		0.100	ND		
Indeno (1.2.3-cd) pyrene	n	**	11		0.100	ND	n	
Isophorone		11	"		0.100	ND	н .	
2-Methylnaphthalene	"	0	11		0.100	ND	**	
2-Methylphenol	11	**	н		0.100	ND	11	
3 & 4-Methylphenol	· ·	**	н		0.100	ND		
Naphthalene	н	11	11		0.100	ND	н	
2-Nitroaniline	"	11	H		0.500	ND	"	~~~
3-Nitroaniline	II .	11	H*		0.500	ND	"	
4-Nitroaniline	n	11	**		0.500	ND	"	
Nitrobenzene	н	H	**		0.100	ND	"	
2-Nitrophenol	"	n			0.100	ND	H	
4-Nitrophenol	**	н	. "		0.500	ND	**	
N-Nitrosodiphenylamine	n	"	11		0.200	ND	"	
N-Nitrosodi-n-propylamine	**	н	н		0.100	ND	H	
Pentachlorophenol	"	n	n		0.500	ND	n	
Phenanthrene	**	u .			0.100	ND	"	
Phenol	**	"	**		0.100	ND	н	
Pyrene	**	**	**		0.100	ND	n	
1.2.4-Trichlorobenzene	**	11	۳.		0.100	ND	n	
2.4.5-Trichlorophenol	"	**	**		0.500	ND	,,	
2.4.6-Trichlorophenol	**	11	u		0.100	ND	"	
Surrogate: 2-FP	"	"	"	19.0-141		71.3	%	
Surrogate: Phenol-d6	"	"	"	44.0-128		64.6	"	
Surrogate: 2,4,6-TBP	"	"	"	10.0-137		96.4	"	
Surrogate: Nitrobenzene-d5	"	"	"	33 0-108		76.4	"	
Surrogate: 2-FBP	"	"	"	51.0-124		93.3	"	
Surrogate: p-Terphenyl-d14	"	"	"	48.0-149		114	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definit

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Tetra Tech, Inc. 600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98 Received: 8/21/98

Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci

Reported: 9/25/98 13:58

## Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-PW1-SS-01			<u>B8084</u>	<u>11-05</u>			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		0.100	ND	mg/kg dry	
Acenaphthylene	н	"	"		0.100	ND	"	
Aniline	"	**	11		0.100	ND	II	
Anthracene	н	**	•		0.100	ND	11	
Benzoic Acid	"		"		0.500	ND	н	
Benzo (a) anthracene	ii,		••		0.100	ND	11	
Benzo (b) fluoranthene	"	"	"		0.100	ND	11	
Benzo (k) fluoranthene	,	**	**		0.100	ND	· ·	
Benzo (ghi) perylene	**	"	••		0.100	ND	"	
Benzo (a) pyrene	"		"		0.100	ND	"	
Benzyl alcohol	n n	"	**		0.100	ND	"	
Bis(2-chloroethoxy)methane	н	**	**		0.100	ND	11	
Ris(2-chloroethyl)ether	n		••		0.100	ND	11	
is(2-chloroisopropyl)ether			"		0.100	ND	n	
Bis(2-ethylhexyl)phthalate	n	••	**		0.500	ND	"	
4-Bromophenyl phenyl ether		"			0.100	ND	"	
Butyl benzyl phthalate	**	"			0.100	ND	**	
Carbazole		,,	••		0.500	ND	"	
4-Chloroaniline	••	**	11		0.100	ND	"	
2-Chloronaphthalene	н		**		0.100	ND		
4-Chloro-3-methylphenol	••	"			0.100	ND	n	
2-Chlorophenol	**	n	••		0.100	ND	n	
4-Chlorophenyl phenyl ether			n		0.100	ND	n	
Chrysene	н		**		0.100	ND		
Dibenz (a.h) anthracene	•		ti .		0.100	ND		
Dibenzofuran	**	"	11		0.100	ND	,,	
Di-n-butyl phthalate	,,	**			0.500	ND	11	
1.3-Dichlorobenzene	••	.,	**		0.100	ND	"	
1.4-Dichlorobenzene	**	••			0.100	ND	u.	
1,2-Dichlorobenzene	**	••	n		0.100	ND	"	
3.3'-Dichlorobenzidine					5.00	ND	"	
2.4-Dichlorophenol			н		0.100	ND ND	"	
Diethyl phthalate	,,	**			0.100	ND ND		
2,4-Dimethylphenol	n	11			****		**	
- •					0.100	ND		
Dimethyl phthalate					0.100	ND	н .	
4.6-Dinitro-2-methylphenol	,,	**	"		0.500	ND		
2.4-Dinitrophenol	"	"			0.500	ND	,,	
2.4-Dinitrotoluene	"				0.100	ND	"	

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang Project Manager



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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98
600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-PW1-SS-01 (continued)			B8084	11-05			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98	<del></del>	0.100	ND	mg/kg dry	
Di-n-octyl phthalate	**	n			0.500	ND	"	
Fluoranthene		"	•		0.100	ND	•	
Fluorene	**	11			0.100	ND	11	
Hexachlorobenzene	h	11	"		0.100	ND	н	
Hexachlorobutadiene		n	••		0.100	ND	**	
Hexachlorocyclopentadiene		•			0.100	ND	**	
Hexachloroethane	•	•	· ·		0.100	ND	**	
Indeno (1.2.3-cd) pyrene	11	"	н .		0.100	ND	H	
Isophorone	"	"	H		0.100	ND	N	
2-Methylnaphthalene	"	"	**		0.100	ND	**	
2-Methylphenol	••		**		0.100	ND	н	
3 & 4-Methylphenol	**	••			0.100	ND	n	
Naphthalene	**	••	"		0.100	ND	"	
2-Nitroaniline	11		n		0.500	ND	н	
3-Nitroaniline	11	n .	n		0.500	ND	н	
4-Nitroaniline	ı,		**		0.500	ND	**	
Nitrobenzene			•		0.100	ND	**	
2-Nitrophenol		**	"		0.100	ND	11	
4-Nitrophenol	"	11	н .		0.500	ND	n	
N-Nitrosodiphenylamine	**		n		0.200	ND	n	
N-Nitrosodi-n-propylamine	**	11	•		0.100	ND	н	
Pentachlorophenol	**	"	"		0.500	ND	**	
Phenanthrene	н	n	"		0.100	ND		
Phenol	н		"		0.100	ND	ti .	
Pyrene	"	10	n		0.100	ND	11	
1.2.4-Trichlorobenzene	"	1+	•		0.100	ND	**	
2.4.5-Trichlorophenol	••	н	••		0.500	ND	H	
2.4.6-Trichlorophenol	н	•	u .		0.100	ND	u	
Surrogate 2-FP	"	"	"	19.0-141		67.7	%	
Surrogate: Phenol-d6	"	"	"	44.0-128		66.2	"	
Surrogate: 2,4,6-TBP	"	"	"	10.0-137		126	"	
Surrogate: Nitrobenzene-d5	"	"	"	33.0-108		70.7	"	
Surrogate: 2-FBP	"	"	"	51.0-124		84.8	"	
Surrogate p-Terphenyl-d14	"	"	"	48.0-149		117,	"	

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\*Refer to end of report for text of notes and defin...

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Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle. WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

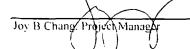
Received: 8/21/98

Reported: 9/25/98 13:58

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP1-SS-01			B8084	11-06			Soil	
Acenaphthene	0880681	8/25/98	8/27/98	<del></del>	0.500	ND	mg/kg dry	
Acenaphthylene	11	н	"		0.500	ND	"	
Aniline	**	••			0.500	ND	"	
Anthracene	"	"	"		0.500	ND	"	
Benzoic Acid		11	••		2.50	ND	"	
Benzo (a) anthracene	n .	ŧi.	••		0.500	ND	n	
Benzo (b) fluoranthene	,,		**		0.500	ND	"	
Benzo (k) fluoranthene	**	"			0.500	ND	**	
Benzo (ghi) perylene	**				0.500	ND	•	
Benzo (a) pyrene	16	11	п		0.500	ND	u .	
Benzyl alcohol	11	19	n		0.500	ND	11	
Bis(2-chloroethoxy)methane	H	"	••		0.500	ND		
Ris(2-chloroethyl)ether	"	**	er e		0.500	ND	"	
sis(2-chloroisopropyl)ether	•	"			0.500	ND	a	
Bis(2-ethylhexyl)phthalate	11	"	**		2.50	ND	· ·	
4-Bromophenyl phenyl ether		•	11		0.500	ND	11	
Butyl benzyl phthalate	"	H	н		0.500	ND	n	
Carbazole		11	**		2.50	ND	"	
4-Chloroaniline	11	n	"		0.500	ND	н	
2-Chloronaphthalene	н	11	11		0.500	ND	••	
4-Chloro-3-methylphenol	**		••		0.500	ND		
2-Chlorophenol	н	**	u		0.500	ND	u	
4-Chlorophenyl phenyl ether	**	••	11		0.500	ND	n	
Chrysene	O.		"		0.500	ND	n	
Dibenz (a.h) anthracene	n	••	· ·		0.500	ND	n	
Dibenzofuran	"		**		0.500	ND	11	
Di-n-butyl phthalate	"	11	n		2.50	ND	"	
1.3-Dichlorobenzene	"	11	•		0.500	ND	n	
1.4-Dichlorobenzene		**	n		0.500	ND	н	
1.2-Dichlorobenzene	n				0.500	ND	**	
3.3'-Dichlorobenzidine	II.	п	"		25.0	ND	n	
2.4-Dichlorophenol	**	"			0.500	ND	"	
Diethyl phthalate	39	n	n		0.500	ND	н	
2.4-Dimethylphenol	11		"		0.500	ND	n	
Dimethy Lphthalate		•	**		0.500	ND	**	
4.6-Dinitro-2-methylphenol	**	"	•		2.50	ND		
2.4-Dinitrophenol	"	"	"		2.50	ND	п	
2.4-Dinitrotoluene	11	••	0		0.500	ND	**	

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Tetra Tech. Inc.

Project:

Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

600 University St., Suite 800 Seattle, WA 98101

Project Number:

10022-03 Project Manager: Carlotta Cellucci

8/21/98 Received:

9/25/98 13:58 Reported:

### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP1-SS-01 (continued)			B8084	11-06			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98	<del></del>	0.500	ND	mg/kg dry	
Di-n-octyl phthalate	**	"	11		2.50	ND	"	
Fluoranthene	**	"	**		0.500	ND	n	
Fluorene	**	"	"		0.500	ND		
Hexachlorobenzene		"	**		0.500	ND	**	
Hexachlorobutadiene	•		**		0.500	ND		
Hexachlorocyclopentadiene	••	11	н		0.500	ND		
Hexachloroethane	••	"	н		0.500	ND	"	
Indeno (1.2.3-cd) pyrene	**	#	**		0.500	ND	rr .	
Isophorone	••		11		0.500	ND	н	
2-Methylnaphthalene	**		11		0.500	ND	"	
2-Methylphenol	н	н			0.500	ND	н	
3 & 4-Methylphenol	11	н	10		0.500	ND.	н	
Naphthalene	**	•	Ħ	•	0.500	ND	H	
2-Nitroaniline	**	•	**		2.50	ND	"	
3-Nitroaniline	**	•	**		2.50	ND	II .	
4-Nitroaniline	**	,,	"		2.50	ND	11	
Nitrobenzene	11	"	**		0.500	ND	"	
2-Nitrophenol		**			0.500	ND	11	
4-Nitrophenol	1+	19	н		2.50	ND	и	
N-Nitrosodiphenylamine	н	19	n		1.00	ND	**	
N-Nitrosodi-n-propylamine	D	n	н		0.500	ND	**	
Pentachlorophenol		**	"		2.50	ND	n	
Phenanthrene	"	••	**		0.500	ND	н	
Phenol	"	"	**		0.500	ND	11	
Pyrene	**	"	п		0.500	ND	"	
1.2.4-Trichlorobenzene	11	11	H		0.500	ND	**	
2.4.5-Trichlorophenol	н	"	P		2.50	ND	11	
2.4.6-Trichlorophenol	P	"	**		0.500	ND	"	
Surrogate. 2-FP	"	"	"	19.0-141		62.9	%	
Surrogate: Phenol-d6	,,	"	"	44.0-128		68.3	"	
Surrogate: 2.4.6-TBP	"	"	"	10.0-137		137	"	
Surrogate Nitrobenzene-d5	. "	"	"	33.0-108		71.0	"	
Surrogate: 2-FBP	"	"	"	51.0-124		93.4	"	
Surrogate: p-Terphenyl-d14	"	"	"	48.0-149		93.1	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

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Tetra Tech, Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98 600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

## Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes ·
8-19-98-BIL-TP2-SS-01			B8084	11- <u>07</u>			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98	<del></del>	0.500	ND	mg/kg dry	
Acenaphthylene	**	· ·			0.500	ND	"	
Aniline	11	п	**		0.500	ND	n	
Anthracene	,,	••			0.500	ND	н	
Benzoic Acid	r	••	**		2.50	ND	"	
Benzo (a) anthracene	n	**	**		0.500	1.72	н	
Benzo (b) fluoranthene	n	**	••		0.500	2.88	н	
Benzo (k) fluoranthene	15	"	**		0.500	0.890	n	
Benzo (ghi) perylene	11	н	19		0.500	1.40	11	
Benzo (a) pyrene	15	11	**		0.500	2.05	н	
Benzyl alcohol	**	**	**		0.500	ND	н	
Bis(2-chłoroethoxy)methane	**		11		0.500	ND	11	
Bis(2-chloroethyl)ether	10		11		0.500	ND	11	
sis(2-chloroisopropyl)ether	41	n	**		0.500	ND	н	
Bis(2-ethylhexyl)phthalate	p	11	11		2.50	ND	u	
4-Bromophenyl phenyl ether	**	n	••		0.500	ND	**	
Butyl benzyl phthalate	**		н		0.500	ND	II .	
Carbazole	**	**	**		2.50	ND	н	
4-Chloroaniline	11	н			0.500	ND	41	
2-Chloronaphthalene	10		11		0.500	ND	"	
4-Chloro-3-methylphenol	**	•	11		0.500	ND	**	
2-Chlorophenol	11	10	**		0.500	ND	**	
1-Chlorophenyl phenyl ether	"	11	н		0.500	ND	*11	
Chrysene	н	"	ш		0.500	1.79	**	
Dibenz (a.h) anthracene	н	li .			0.500	ND	**	
Dibenzofuran	**	"	n		0.500	ND	**	
Di-n-butyl phthalate		n	"		2.50	ND	n	
1.3-Dichlorobenzene	"	"			0.500	ND	n	
1.4-Dichlorobenzene	u	u	n .		0.500	ND	e	
.2-Dichlorobenzene	"	**	**		0.500	ИD	**	
3.3 -Dichlorobenzidine		"	n		25.0	ND	tt	
2.4-Dichlorophenol	11	"	n		0.500	ND	u	
Diethyl phthalate	**	**	**		0.500	ND	··	
2.4-Dimethylphenol	••		••		0.500	ND	•	
Dimethyl phthalate	11				0.500	ND		
4.6-Dinitro-2-methylphenol	**	"	••		2.50	ND		
2.4-Dinitrophenol	**	н	н		2.50	ND		
2.4-Dinitrotoluene	••	"			0.500	ND	н	

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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03

Project Manager: Carlotta Cellucci

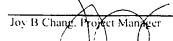
Received: 8/21/98

Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	<u>-</u>		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP2-SS-01 (continued)			B8084	<u> 11-07</u>			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98		0.500	ND	mg/kg dry	
Di-n-octyl phthalate	**	**	"		2.50	ND	н	
Fluoranthene	**	**	**		0.500	2.48	n	
Fluorene	**		••		0.500	ND	**	
Hexachlorobenzene	**	.,	**		0.500	ND	**	
Hexachlorobutadiene	**				0.500	ND	п	
Hexachlorocyclopentadiene		H	"		0.500	ND	"	
Hexachloroethane		••			0.500	ND	**	
Indeno (1,2,3-cd) pyrene	**	41	11		0.500	1.56		
Isophorone	**	n	11		0.500	ND	o o	
2-Methylnaphthalene	**	II.	"		0.500	ND	••	
2-Methylphenol	"				0.500	ND	11	
3 & 4-Methylphenol		**	•1		0.500	ND	**	
Naphthalene		**	**	•	0.500	ND	••	<u> </u>
2-Nitroaniline		**	**		2.50	ND	n	
3-Nitroaniline	**	**	,,		2.50	ND	н	
4-Nitroaniline		**			2.50	ND	**	
Nitrobenzene	•	"	n		0.500	ND	n	
2-Nitrophenol	"	"	**		0.500	ND	**	
4-Nitrophenol	"	"	**		2.50	ND	11	
N-Nitrosodiphenylamine	"	**	**		1.00	ND	H	
N-Nitrosodi-n-propylamine	••	**	"		0.500	ND	"	
Pentachlorophenol	**		••		2.50	ND	н	
Phenanthrene	n	11			0.500	0.709	••	
Phenol	b	**	••		0.500	ND	**	
Pyrene	**	"	"		0.500	4.05	**	
1.2.4-Trichlorobenzene	**		11		0.500	ND	**	
2.4.5-Trichlorophenol	••	I+	**		2.50	ND	"	
2.4.6-Trichlorophenol	11	19	11		0.500	ND	"	
Surrogate: 2-FP	"	"	,,	19.0-141		62.5	%	
Surrogate Phenol-d6	"	"	"	44.0-128		64.6	"	
Surrogate: 2.4.6-TBP	"	n	"	10.0-137		116	n	
Surrogate: Nurobenzene-d5	. "	"	"	33.0-108		66.1	"	
Surrogate, 2-FBP	n .	"	"	51.0-124		89.1	"	
Surrogate p-Terphenyl-d14	"	"	,,	48.0-149		115	"	

North Creek Analytical - Bothell





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Tetra Tech. Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting	<del></del> -		
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
							<u> </u>	
8-19-98-BIL-TP4-SS-01			<u>B8084</u>	<u>11-08</u>			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		0.100	ND	mg/kg dry	
Acenaphthylene	"	••	"		0.100	ND	17	
Aniline	H	**	11		0.100	ND	,,	
Anthracene	" .	<b>51</b>	**		0.100	ND	"	
Benzoic Acid	н	ıı	•		0.500	ND	"	
Benzo (a) anthracene	11	**	11		0.100	0.111	"	
Benzo (b) fluoranthene	"	"	**		0.100	0.132	н	
Benzo (k) fluoranthene	"	ri	**		0.100	ND	п	
Benzo (ghi) perylene	"	**	"		0.100	ND	"	
Benzo (a) pyrene	n	"	**		0.100	ND	11	
Benzyl alcohol	"	17	н		0.100	ND	11	
Bis(2-chloroethoxy)methane	19	rr r	ıi.		0.100	ND	**	
Bis(2-chloroethyl)ether	**	11	"		0.100	ND	H	
Bis(2-chloroisopropyl)ether	11	n	••		0.100	ND	II .	
Bis(2-ethylhexyl)phthalate	n	n	••		0.500	ND	11	
4-Bromophenyl phenyl ether	O	••	**		0.100	ND	**	
Butyl benzyl phthalate	n	н	**		0.100	ND	n	
Carbazole	n	11	••		0.500	ND	11	
4-Chloroaniline	**	•	**		0.100	ND	"·	
2-Chloronaphthalene	•	n	**		0.100	ND	"	
4-Chloro-3-methylphenol					0.100	ND	n	
2-Chlorophenol	**	11	59		0.100	ND	n	
4-Chlorophenyl phenyl ether		**	. **		0.100	ND	•	
Chrysene	**	*1	11		0.100	0.130	"	
Dibenz (a.h) anthracene		**	**		0.100	ND		
Dibenzofuran	11	**	**		0.100	ND	0	
Di-n-butyl phthalate	et				0.500	ND		
1.3-Dichlorobenzene		••			0.100	ND	"	
1.4-Dichlorobenzene		н	**		0.100	ND	"	
1.2-Dichlorobenzene	,,	**			0.100	ND		
3.3'-Dichlorobenzidine	**	**	**		5.00	ND	н	
2.4-Dichlorophenol	н		**		0.100	ND ND		
Diethyl phthalate	n	н	H		0.100	ND ND	"	
2.4-Dimethylphenol	**				0.100	ND	,,	
Dimethyl phthalate	11	•	**		0.100		11	
4.6-Dinitro-2-methylphenol	n	n				ND		
		,,			0.500	ND		
2.4-Dinitrophenol	"	"	.,		0.500	ND		
2.4-Dinitrotoluene	••	••			0.100	ND		

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manager



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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

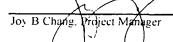
Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-19-98-BIL-TP4-SS-01 (continued)			B8084	11-08			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98	· <del></del>	0.100	ND	mg/kg dry	
Di-n-octyl phthalate	n	**	v		0.500	ND	,, ,	
Fluoranthene	11	**	11		0.100	0.164		
Fluorene	11		11		0.100	ND	**	
Hexachlorobenzene	11		11		0.100	ND	11	
Hexachlorobutadiene	11	**	n		0.100	ND	19	
Hexachlorocyclopentadiene	H	n	11		0.100	ND	n	
Hexachloroethane	n	13	m .		0.100	ND	11	
Indeno (1.2.3-cd) pyrene	n	n	**		0.100	ND	**	
Isophorone	11	4	"		0.100	ND	· ·	
2-Methylnaphthalene	n .	**	n		0.100	ND		
2-Methylphenol	11		"		0.100	ND	**	
3 & 4-Methylphenol	11	**	н		0.100	ND	"	
Naphthalene	le .	11	n		0.100	ND	"	
2-Nitroaniline	11	**	••		0.500	ND	"	~
3-Nitroaniline	n	11	"		0.500	ND	"	
4-Nitroaniline	h	n	11		0.500	ND	"	
Nitrobenzene	h	••	"		0.100	ND	"	
2-Nitrophenol	ti.				0.100	ND	"	
4-Nitrophenol	11		n		0.500	ND	"	
N-Nitrosodiphenylamine	10	11	"		0.200	ND	"	
N-Nitrosodi-n-propylamine	11	н	"		0.100	ND	"	
Pentachlorophenol	H	•	**		0.500	ND	II.	
Phenanthrene	H	**	n		0.100	ND	**	
Phenol	**	**	н		0.100	ND	"	
Pyrene	11		"		0.100	0.222	II.	
1.2.4-Trichlorobenzene	11	**	**		0.100	ND	**	
2.4.5-Trichlorophenol	н	••	"		0.500	ND	•	
2.4.6-Trichlorophenol	ы	••	**		0.100	ND	11	
Surrogate: 2-FP	"	"	"	19.0-141		76.5	%	
Surrogate: Phenol-d6	"	"	"	44.0-128		71.8	"	
Surrogate: 2,4,6-TBP	"	"	"	10.0-137		131	"	
Surrogate: Nurobenzene-d5	"	"	"	33.0-108		80.8	"	
Surrogate: 2-FBP	"	"	**	51.0-124		94.4	"	
Surrogate p-Terphenyl-d14	"	"	"	48.0-149		115	"	

North Creek Analytical - Bothell





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Project: Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

Seattle, WA 98101

Project Number: 10022-03

Received: 8/21/98

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-01			B8084	11-09			· <u>Soil</u>	
Acenaphthene	0880681	8/25/98	9/5/98		5.00	ND	mg/kg dry	
Acenaphthylene		**	"		5.00	ND	"	
Aniline	n	n ·	"		5.00	ND	"	
Anthracene	P	••			5.00	ND	"	
Benzoic Acid	н	11	"		25.0	ND	**	
Benzo (a) anthracene	"	**	"		5.00	6.31	*1	
Benzo (b) fluoranthene	11		**		5.00	7.61	n	
Benzo (k) fluoranthene	11	**	o o		5.00	ND	"	
Benzo (ghi) perylene	••	"			5.00	5.79	и	
Benzo (a) pyrene	**	**	"		5.00	6.03	19	
Benzyl alcohol	"	•	n		5.00	ND	**	
Bis(2-chloroethoxy)methane		"	,,		5.00	ND	"	
Bis(2-chloroethyl)ether	"	**	**		5.00	ND	u	
3is(2-chloroisopropyl)ether	O	•	11		5.00	ND	H	
Bis(2-ethylhexyl)phthalate	**	n	11		25.0	ND	11	
4-Bromophenyl phenyl ether	tt	•	**		5.00	ND	n	
Butyl benzyl phthalate	n	11	**		5.00	ND	· ·	
Carbazole	•	**	lt.		25.0	ND	n	
4-Chloroaniline	11	n	**		5.00	ND	11	
2-Chloronaphthalene	11		11		5.00	ND	h	
4-Chloro-3-methylphenol	•	**	"		5.00	ND		
2-Chlorophenol	n		**		5.00	ND	•	
4-Chlorophenyl phenyl ether	n	**	"		5.00	ND	n	
Chrysene	10	•	н		5.00	6.54	· ·	
Dibenz (a,h) anthracene	n	**	**		5.00	ND	n	
Dibenzofuran		**			5.00	ND	11	
Di-n-butyl phthalate	••	0	••		25.0	ND	"	
1.3-Dichlorobenzene	.,	11	••		5.00	ND	· ·	
1.4-Dichlorobenzene	n .	**	O		5.00	ND	n	
1.2-Dichlorobenzene		*	**		5.00	ND	н	
3.3'-Dichlorobenzidine		••	••		250	ND	••	
2.4-Dichlorophenol		"			5.00	ND	u	
Diethyl phthalate	и	**	**		5.00	ND	n	
2.4-Dimethylphenol	••	n	н		5.00	ND	11	
Dimethyl phthalate	•	41	**		5.00	ND.		
4.6-Dinitro-2-methylphenol	•	"			25.0	ND	n	
2.4-Dinitrophenol	U		10		25.0	ND	"	
2.4-Dinitrotoluene	••	"	**		5.00	ND	"	

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\*Refer to end of report for text of notes and definitions.

Joy B Chang. F rojeki Manager



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Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-01 (continued)			B80841	<u> 1-09</u>			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	9/5/98		5.00	ND	mg/kg dry	
Di-n-octyl phthalate	11	11	н		25.0	ND	"	
Fluoranthene	n	II .	н		5.00	10.5	**	
Fluorene	n	"	"		5.00	ND	"	
Hexachlorobenzene	•	**	H .		5.00	ND	10	
Hexachlorobutadiene		"	11		5.00	ND	n	
Hexachlorocyclopentadiene	**	n			5.00	ND	*	
Hexachloroethane	11	ч	"		5.00	ND	••	
Indeno (1,2,3-cd) pyrene	11	11			5.00	5.19	**	
Isophorone		"	n		5.00	ND	"	
2-Methylnaphthalene	"	11	**		5.00	ND	*	
2-Methylphenol	"	n	11		5.00	ND	"	
3 & 4-Methylphenol	11	**	11		5.00	ND	п	
Naphthalene	n	**	n		5.00	ND	"	
2-Nitroaniline	**	· ·	11		25.0	ND	**	
3-Nitroaniline	"	"	.,		25.0	ND	n	
4-Nitroaniline	**	"	ti		25.0	ND	•	
Nitrobenzene	II .	"	"		5.00	ND	r.	
2-Nitrophenol	**	"	10		5.00	ND	**	
4-Nitrophenol	"	"	**		25.0	ND	••	
N-Nitrosodiphenylamine	**	n			10.0	ND	**	
N-Nitrosodi-n-propylamine	11	"			5.00	ND	11	
Pentachlorophenol	н	**	ti		25.0	ND	**	
Phenanthrene	н	"	**		5.00	12.8	11	
Phenol	"	"	и		5.00	ND	"	
Pyrene	u	··	"		5.00	15.8	11	
1.2.4-Trichlorobenzene	"	••	••		5.00	ND	"	
2.4.5-Trichlorophenol		17	U		25.0	ND	•	
2.4.6-Trichlorophenol	"	"	u		5.00	ND	**	
Surrogate, 2-FP	"	"	"	19 0-141		37.9	%	
Surrogate., Phenol-d6	,,	"	"	44.0-128		30.0	"	4
Surrogate: 2.4.6-TBP	"	"	et .	10.0-137		47.9	"	
Surrogate: Nitrobenzene-d5	"	"	"	33.0-108		50.0	"	
Surrogate: 2-FBP	"	"	"	51 0-124		82.1	"	
Surrogate: p-Terphenyl-d14	"	"	••	48.0-149		122	"	

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Joy B Chang, Project Munager

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Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02			B8084	11-10			Soil	
Acenaphthene	0880681	8/25/98	8/27/98		0.500	ND	mg/kg dry	
Acenaphthylene	n	11	**		0.500	ND	"	
Aniline	"	••	**		0.500	ND	"	
Anthracene	n		**		0.500	ND	н	
Benzoic Acid	"	н	•		2.50	ND	ti .	
Benzo (a) anthracene	**	••	11		0.500	ND	•	
Benzo (b) fluoranthene	,,	н	"		0.500	ND	н	
Benzo (k) fluoranthene	n .	н	"		0.500	ND	н	
Benzo (ghi) perylene	· ·	••	**		0.500	ND		
Benzo (a) pyrene	**	"			0.500	ND	H	
Benzyl alcohol	n		"		0.500	ND	*	
Bis(2-chloroethoxy)methane	*1	**	•		0.500	ND	н	
Ris(2-chloroethyl)ether	11	n	**		0.500	ND	"	
is(2-chloroisopropyl)ether	**	11	11		0.500	ND	**	
Bis(2-ethylhexyl)phthalate	**		**		2.50	ND	"	
4-Bromophenyl phenyl ether	**	и	"		0.500	ND	"	
Butyl benzyl phthalate	**	"			0.500	ND	н	
Carbazole	0	••	11		2.50	ND	н	
4-Chloroaniline	**	н	••		0.500	ND	"	
2-Chloronaphthalene	**	н	19		0.500	ND	**	
4-Chloro-3-methylphenol		••	II .		0.500	ND	Ħ	
2-Chlorophenol	**	н	**		0.500	ND	**	
4-Chlorophenyl phenyl ether	••	н			0.500	ND	"	
Chrysene	0	••	11		0.500	ND	11	
Dibenz (a.h) anthracene	**	n			0.500	ND	16	
Dibenzofuran	**		11		0.500	ND	11	
Di-n-butyl phthalate	"	**	11		2.50	ND	•	
1.3-Dichlorobenzene	"	n	n *		0.500	ND	н	
1.4-Dichlorobenzene	"	••	n		0.500	ND	n .	
1.2-Dichlorobenzene	"				0.500	ND	11	
3.3 Dichlorobenzidine	**	tr	**		25.0	ND	**	
2.4-Dichlorophenol	· n		•		0.500	ND		
Diethyl phthalate	H	"			0.500	ND	n	
2.4-Dimethylphenol		II .	"		0.500	ND	n	
Dimethyl phthalate		11			0.500	ND	n .	
4.6-Dinitro-2-methylphenol	"	n	Ď		2.50	ND	n	
2.4-Dinitrophenol	**	11	er e		2.50	ND	**	
2.4-Dinitrotoluene		n			0.500	ND	••	

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Project:

Bradford Island Landfill

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600 University St., Suite 800

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Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit_	Result	Units	Notes*
8-20-98-BIL-TP6-SS-02 (continued)			B8084	11-10			Soil	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98		0.500	ND	mg/kg dry	
Di-n-octyl phthalate	**	11	н		2.50	ND	"	
Fluoranthene	n	11	"		0.500	ND	**	
Fluorene	н	**	*1		0.500	ND	и	
Hexachlorobenzene	11	н	**		0.500	ND		
Hexachlorobutadiene	"	**	н		0.500	ND		
Hexachlorocyclopentadiene	"	**	n		0.500	ND	11	
Hexachloroethane		10	"		0.500	ND	17	
Indeno (1.2.3-cd) pyrene	10	**	**		0.500	ND	н	
Isophorone	"	•	н		0.500	ND	11	
2-Methylnaphthalene	ч	**	н		0.500	ND	"	
2-Methylphenol	**	11	•		0.500	ND	ri	
3 & 4-Methylphenol	**	**	"		0.500	ND	"	
Naphthalene	11	ч	н		0.500	ND	•	
2-Nitroaniline	U	•	n		2.50	ND	"	
3-Nitroaniline	11	**	,,		2.50	ND	"	
4-Nitroaniline	••	**	II .		2.50	ND	•	
Nitrobenzene	**	11	rr r		0.500	ND	"	
2-Nitrophenol	14	•	"		0.500	ND	•	
4-Nitrophenol	10	**	**		2.50	ND		
N-Nitrosodiphenylamine	Ħ	**	н		1.00	ND	IP.	
N-Nitrosodi-n-propylamine	**	11	n		0.500	ND	,,	
Pentachlorophenol	**	••	•		2.50	ND	•	
Phenanthrene	**	**	н		0.500	ND		
Phenol	••	+ 1t	11		0.500	ND	19	
Pyrene	**	D			0.500	ND	•	
1.2.4-Trichlorobenzene					0.500	ND	**	
2.4.5-Trichlorophenol	••	11	"		2.50	ND	н	
2.4.6-Trichlorophenol	11	11	•		0.500	ND	n	
Surrogate 2-FP	"	"	"	19.0-141		7 <b>4</b> . I	%	
Surrogate. Phenol-d6	"	"	"	<i>11.0-128</i>		68.5	"	
Surrogate: 2,4,6-TBP	"	"	"	10.0-137		105	"	
Surrogate. Nurobenzene-d5	. "	"	"	33.0-108		72.1	"	
Surrogate 2-FBP	"	"	"	51.0-124		97.6	,,	
Surrogate. p-Terphenyl-d14	"	"	"	48.0-149		116	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definite

Joy B Chang, Project Manager

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Tetra Tech. Inc.

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# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
		_						
8-20-98-BIL-TP5-SS-01			B8084	11-11			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		2.50	ND	mg/kg dry	
Acenaphthylene			11		2.50	ND		
Aniline	n	11	n		2.50	ND	11	
Anthracene		11	11		2.50	ND	71	8
Benzoic Acid	"	n	••		12.5	ND	**	
Benzo (a) anthracene	**		*1		2.50	ND	11	8
Benzo (b) fluoranthene	11	It.	н		2.50	ND	17	8
Benzo (k) fluoranthene	u u	**	"		2.50	ND	"	8
Benzo (ghi) perylene		11			2.50	ND	"	8
Benzo (a) pyrene	n	n .			2.50	ND	"	8
Benzyl alcohol	11	**	**		2.50	ND	"	
Bis(2-chloroethoxy)methane	11		i.		2.50	ND	*1	
Bis(2-chloroethyl)ether	**	"	"		2.50	ND	n	
Bis(2-chloroisopropyl)ether	n	"	**		2.50	ND	n	
Bis(2-ethylhexyl)phthalate	11	17	**		12.5	ND	"	8
4-Bromophenyl phenyl ether	•	и	н		2.50	ND	"	8
Butyl benzyl phthalate		**			2.50	ND	"	8
Carbazole	**	11			12.5	ND	11	8
4-Chloroaniline	11	II.			2.50	ND	"	
2-Chloronaphthalene	11		"		2.50	ND		•
4-Chloro-3-methylphenol	71				2.50	ND	••	
2-Chlorophenol	н	R	"		2.50	ND		
4-Chlorophenyl phenyl ether		•	. "		2.50	ND	"	
Chrysene	**	e e			2.50	ND		8
Dibenz (a.h) anthracene	"		••		2.50	ND		8
Dibenzofuran	n	11	11		2.50	ND	n	Ü
Di-n-butyl phthalate	n		11		12.5	ND		8
1.3-Dichlorobenzene	••	n	**		2.50	ND	11	O
1.4-Dichlorobenzene	11	*1			2.50	ND ND	"	
1.2-Dichlorobenzene	,,	D					"	
	n	10	,,		2.50	ND	"	0
3.3 -Dichlorobenzidine					125	ND	0	8
2.4-Dichtorophenol	**	"			2.50	ND		
Diethyl phthalate	"	"	.,		2.50	ND		
2.4-Dimethy Iphenol					2.50	ND	••	
Dimethyl phthalate	19	"	**		2.50	ND	••	
4.6-Dinitro-2-methylphenol	11	"	н		12.5	ND	••	8
2.4-Dinitrophenol	**	и	"		12.5	ND	"	
2.4-Dinitrotoluene		11	**		2.50	ND	**	

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600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Received: 8/21/98

9/25/98 13:58 Reported:

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP5-SS-01 (continued)			B80841	1-11			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	8/27/98	-	2.50	ND	mg/kg dry	
Di-n-octyl phthalate	"	0	11		12.5	ND	"	8
Fluoranthene	**	**	11		2.50	ND	**	8
Fluorene		**	"		2.50	ND	P	
Hexachlorobenzene	"	II.	**		2.50	ND	•	8
Hexachlorobutadiene	11		н		2.50	ND		
Hexachlorocyclopentadiene	11	11	II		2.50	ND	O .	
Hexachloroethane	11	51	н		2.50	ND	•	
Indeno (1.2.3-cd) pyrene	•	H	"		2.50	ND	n	8
Isophorone	11	11	n		2.50	ND	19	
2-Methylnaphthalene	"	11	"		2.50	ND		
2-Methylphenol	"	•	"		2.50	ND	· ·	
3 & 4-Methylphenol	"	•	11		2.50	ND		
Naphthalene	"	"	н		2.50	ND	Ħ	(
2-Nitroaniline		**	n		12.5	ND	•	$\sim$
3-Nitroaniline	n	**	n		12.5	ND	**	
4-Nitroaniline	11	H .	11		12.5	ND	· ·	
Nitrobenzene	n	11	"		2.50	ND	•	
2-Nitrophenol	н	n	"		2.50	ND	**	
4-Nitrophenol	11		"		12.5	ND	n	
N-Nitrosodiphenylamine	n	**	11		5.00	ND	"	8
N-Nitrosodi-n-propylamine	17		II .		2.50	ND		
Pentachlorophenol	H	**	н		12.5	ND	n	8
Phenanthrene	"	**	"		2.50	ND	**	8
Phenot	**	11	n		2.50	ND	"	
Pyrene	n	ji.	"		2.50	ND	"	8
1.2.4-Trichlorobenzene	11	"	."		2.50	ND	•	
2.4.5-Trichlorophenol	n	**	"		12.5	ND	"	
2.4.6-Trichlorophenol	II.	**	11		2.50	ND	п	
Surrogate: 2-FP	"	"	"	19.0-141		61.0	%	
Surrogate. Phenol-d6	"	"	"	44.0-128		74.0	"	
Surrogate: 2,4,6-TBP	"	"	"	10.0-137		55.1	"	
Surrogate. Nitrobenzene-d5	"	"	"	33.0-108		70.9	"	
Surrogate: 2-FBP	"	"	"	51.0-124		101	"	
Surrogate, p-Terphenyl-d14	,,	,,	"	48.0-149		94.9	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

18939 120th Avenue N E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton. OR 97008-7132



BOTHELL • (425) 420-9200 • FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc. Sampled: 8/17/98 to 8/20/98 Project: Bradford Island Landfill Received: 8/21/98 600 University St., Suite 800 Project Number: 10022-03

Seattle, WA 98101 Reported: 9/25/98 13:58 Project Manager: Carlotta Cellucci

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01			B8084	11 12			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	9/5/98	11-12	2.50	ND	mg/kg dry	
Acenaphthylene	"	"	"		2.50	ND	mg/kg di;	
Aniline	,,	н	**		2.50	ND	n	
Anthracene	"	11	**	•	2.50	ND	n	
Benzoic Acid		**	•		12.5	ND	н	
Benzo (a) anthracene		11	**		2.50	ND	н	
Benzo (b) fluoranthene		•	"		2.50	ND	11	
Benzo (k) fluoranthene	**	10	**		2.50	ND	11	
Benzo (ghi) perylene	rı	11			2.50	ND	**	
Benzo (a) pyrene	n	n	,,		2.50	ND	**	
Benzyl alcohol	11	n	ti .		2.50	ND ND	"	
Bis(2-chloroethoxy)methane		•	n		2.50	ND	11	
Bis(2-chloroethyl)ether	**	.,	,,		2.50	ND ND	er e	
sis(2-chloroisopropyl)ether	11	**			2.50	ND ND	**	
Bis(2-ethylhexyl)phthalate	11		11		12.5	ND ND	11	
4-Bromophenyl phenyl ether	"	**	••		2.50	ND ND	**	
	"	•					11	
Butyl benzyl phthalate Carbazole	••	D	•		2.50	. ND	n	
	•				12.5	ND		
4-Chloroaniline					2.50	ND		
2-Chloronaphthalene			"		2.50	ND		
4-Chloro-3-methylphenol	,,		"		2.50	ND	"	
2-Chlorophenol		"	н		2.50	ND	"	
4-Chlorophenyl phenyl ether	"				2.50	ND		
Chrysene		**	"		2.50	ND	"	
Dibenz (a.h) anthracene	**	н	н		2.50	ND	"	
Dibenzofuran		**	**		2.50	ND	н	
Di-n-butyl phthalate	"	н	"		12.5	ND	"	
3-Dichlorobenzene	11	11			2.50	ND	**	
.4-Dichlorobenzene	O	••	••		2.50	ND	11	
.2-Dichlorobenzene	"	15			2.50	ND	17	
3.3'-Dichlorobenzidine	••	**	••		125	ND	11	
2.4-Dichlorophenol					2.50	ND	"	
Diethyl phthalate	· ·	10	**		2.50	ND	n	
2.4-Dimethylphenol	•	"	"		2.50	ND	u	
Dimethyl phthalate	"	"			2.50	ND	11	
l.6-Dinitro-2-methylphenol	o	"			12.5	ND	**	
2.4-Dinitrophenol	n	n			12.5	ND	"	
2,4-Dinitrotoluene	11				2.50	ND	**	

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manager



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03 Project Manager: Carlotta Cellucci

Received: 8/21/98

Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP8-SS-01 (continued)			B8084	11-12			<u>Soil</u>	
2.6-Dinitrotoluene	0880681	8/25/98	9/5/98		2.50	ND	mg/kg dry	
Di-n-octyl phthalate	**	n	•1		12.5	ND	"	
Fluoranthene	**	"	**		2.50	ND	"	
Fluorene	**	n	11		2.50	ND	**	
Hexachlorobenzene		"			2.50	ND	**	
Hexachlorobutadiene		"	**		2.50	ND	n	
Hexachlorocyclopentadiene	**		**		2.50	ND	n	
Hexachloroethane		11	••		2.50	ND	**	
Indeno (1.2,3-cd) pyrene	n	n	"		2.50	ND	"	
Isophorone	н	*	"		2.50	ND	•	
2-Methylnaphthalene		••			2.50	ND	"	
2-Methylphenol	"	u			2.50	ND	*	
3 & 4-Methylphenol	"	••	н		2.50	ND	н	
Naphthalene	**	11	**		2.50	ND	"	<u> </u>
2-Nitroaniline	••	**	**		12.5	ND	n	
3-Nitroaniline	**	n	It.		12.5	ND		
4-Nitroaniline	1+	u .	n		12.5	ND	"	
Nitrobenzene		•	*1		2.50	ND	**	
2-Nitrophenol	**	n			2.50	ND	н	
4-Nitrophenol		•	P		12.5	ND	"	
N-Nitrosodiphenylamine	**	**	**		5.00	ND	11	
N-Nitrosodi-n-propylamine	н	n .	n		2.50	ND	"	
Pentachlorophenol	**	**	**		12.5	ND	· ·	
Phenanthrene .	"	n	**		2.50	ND	19	
Phenol	**	•	It.		2.50	ND	···	
Pyrene	n		••		2.50	ND	II.	
1.2.4-Trichlorobenzene	н	**	**		2.50	ND		
2.4.5-Trichlorophenol	••				12.5	ND	**	
2.4.6-Trichlorophenol	**	n	n		2.50	ND	11	
Surrogate: 2-FP	"	u .	"	19.0-141		66.0	%	•
Surrogate Phenol-d6	"	n	"	44.0-128		52.9	"	
Surrogate: 2,4,6-TBP	"	"	,,	10.0-137		57.1	"	
Surrogate: Nitrobenzene-d5	а	"	"	33.0-108		57.1	"	
Surrogate, 2-FBP	"	"	"	51.0-124		80.1	"	
Surrogate: p-Terphenyl-d14	"	,,	,,	48.0-149		104	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definition.

Joy B Chang Project Manager

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#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes
8-20-98-BIL-TP7-SS-01			B80841	11-13			<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		10.0	ND	mg/kg dry	
Acenaphthylene	n .		**		10.0	ND	11	
Aniline	n	•	0		10.0	ND	**	
Anthracene		11	•		10.0	11.0	H	
Benzoic Acid	10	**			50.0	ND	н	
Benzo (a) anthracene	0	"	*1		10.0	84.3	н	
Benzo (b) fluoranthene	**	11	н		10.0	134	n	
Benzo (k) fluoranthene	Dr.	"	**		10.0	53.4	D	
Benzo (ghi) perylene	•	"	**		10.0	70.4	n	
Benzo (a) pyrene	**	**	11		10.0	103	11	
Benzyl alcohol	**	n	n		10.0	ND		
Bis(2-chloroethoxy)methane	n	"	11		10.0	ND	n	
Sis(2-chloroethyl)ether	**	••	•		10.0	ND	11	
is(2-chloroisopropyl)ether	••	•	11		10.0	ND	11	
Bis(2-ethylhexyl)phthalate	п		•		50.0	73.4	н	
4-Bromophenyl phenyl ether	**	•	н		10.0	ND	II	
Butyl benzyl phthalate	**	н	**		10.0	ND	n	
Carbazole	n	**	н		50.0	ND	"	
4-Chloroaniline	"	**	n		10.0	ND	"	
2-Chloronaphthalene	11		n		10.0	ND	**	
4-Chloro-3-methylphenol		**	n		10.0	ND	н	
2-Chlorophenol		o .	•		10.0	ND	н	
4-Chlorophenyl phenyl ether	n	11	**		10.0	'ND	n	
Chrysene	**	••	"		10.0	89.8	н	
Dibenz (a,h) anthracene	•	**			10.0	19.3	н	
Dibenzofuran	n	"	•		10.0	ND	н	
Di-n-buty1 phthalate	••	••	O.		50.0	ND	н	
1.3-Dichlorobenzene	n				10.0	ND	"	
1.4-Dichlorobenzene	U	**	••		10.0	ND	**	
1.2-Dichlorobenzene	н	**			10.0	ND	"	
3.3 -Dichlorobenzidine	••	**	**		500	ND	н	
2.4-Dichlorophenol	••				10.0	ND	n .	
Diethyl phthalate	п		D		10.0	ND	ii.	
2.4-Dimethylphenol	**	••	P		10.0	ND	**	
Dimethyl phthalate	n .		•		10.0	ND	O	
1.6-Dinitro-2-methylphenol	11	**	11		50.0	ND		
2.4-Dinitrophenol	"		**		50.0	ND	n .	
2.4-Dinitrotoluene	и	n .			10.0	ND	**	

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Tetra Tech. Inc.

Project:

Bradford Island Landfill

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600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci

Received: 8/21/98

9/25/98 13:58 Reported.

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

Soil   Soil		Batch	Date	Date	Surrogate	Reporting			
2.6-Dinitrotoluene	Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
2.6-Dinitrotoluene	8-20-98-BIL-TP7-SS-01 (continued)			<u>B8084</u> 1	<u>11-13</u>			Soil	
Di-n-octyl phthalate	2.6-Dinitrotoluene	0880681	8/25/98			10.0	ND		
Fluoranthene	Di-n-octyl phthalate	н		н		50.0	ND		
Hexachlorobenzene	Fluoranthene		11	H				н	
Hexachlorobutadiene Houd ND Howard N	Fluorene	"	11	n		10.0	ND		
Hexachloroeyclopentadiene	Hexachlorobenzene	n	19	n				**	
Hexachloroeyclopentadiene	Hexachlorobutadiene	n	tt .	II .		10.0	ND	n.	
Indeno (1,2,3-cd) pyrene	Hexachlorocyclopentadiene	n	H	n			ND	н	
Sophorone	Hexachloroethane	**	"	**		10.0	ND	11	
2-Methylnaphthalene 2-Methylphenol	Indeno (1,2,3-cd) pyrene	**	**	11			72.9		
2-Methylphenol	Isophorone	"	**	11		10.0	ND	н	
10.0 ND   10.0 ND   10.0 Naphthalene   10.0 ND   10.0 Naphthalene   10.0 ND   10.0 N	2-Methylnaphthalene	"	**	11		10.0	ND	· ·	
Naphthalene 2-Nitroaniline 3-Nitroaniline 3-Nitroaniline 3-Nitroaniline 3-Nitroaniline 3-Nitroaniline 3-Nitroaniline 3-Nitrobenzene 3-Nitrophenol 3-Nitrobenzene 3-Nitrophenol 3-Nitrosodiphenylamine 3-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-Nitrosodiphenylamine 3-N-N-Nitrosodiphenylamine 3-N-N-Nitrosodiphenylamine 3-N-N-Nitrosodiphenylamine 3-N-N-Nitrosodiphenylamine 3-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N	2-Methylphenol	11	**	н		10.0	ND	•	
2-Nitroaniline	3 & 4-Methylphenol	"	11			10.0	ND .	н	
3-Nitroaniline	Naphthalene	"		"	-	10.0	ND	11	
4-Nitrobaniline Nitrobenzene 2-Nitrophenol 4-Nitrophenol 50.0 ND 4-Nitrophenol 10.0 ND 4-Nitrosodiphenylamine N-Nitrosodiphenylamine N-Nitrosodi-n-propylamine N-Nitrosodi-n-p	2-Nitroaniline	"	D	"		50.0	ND	ч	~
Nitrobenzene " " " " 10.0 ND " 2-Nitrophenol " " " 10.0 ND " 4-Nitrophenol " " " 10.0 ND " " 10.0 ND " 10.	3-Nitroaniline	II .	n	"		50.0	ND	"	
2-Nitrophenol	4-Nitroaniline	U	**	11		50.0	ND	II .	
4-Nitrophenol 50.0 ND " N-Nitrosodiphenylamine 20.0 ND " N-Nitrosodi-n-propylamine 10.0 ND " Pentachlorophenol 50.0 ND " Phenanthrene 10.0 37.5 " Phenol 10.0 ND " Pyrene 10.0 ND " Pyrene 10.0 ND " 1.2.4-Trichlorobenzene 10.0 ND " 2.4.5-Trichlorophenol 10.0 ND " 2.4.5-Trichlorophenol 10.0 ND " 2.4.6-Trichlorophenol 10	Nitrobenzene	11	•	u		10.0	ND	"	
N-Nitrosodiphenylamine """" "10.0 ND " N-Nitrosodi-n-propylamine """ "10.0 ND " Pentachlorophenol """ "10.0 ND " Phenanthrene """ "10.0 37.5 " Phenanthrene """ "10.0 ND " Pyrene 10.0 ND " Pyrene 10.0 ND " 10.4-Trichlorobenzene """ "10.0 ND " 10.4-5-Trichlorophenol """ "10.0 ND " 10.4-6-Trichlorophenol """ "10.0 ND " 10.0 ND	2-Nitrophenol	**	••	u		10.0	ND	17	
N-Nitrosodi-n-propylamine Pentachlorophenol Phenanthrene Phenanthrene Phenon Phyrene Pyrene Pyrene Pour Cal-5-Trichlorophenol Particular ophenol Particular ophenol Pyrene Phenol Phenol Pyrene Phenol Pyrene Phenol Pyrene Phenol Pyrene Phenol Pyrene Phenol Pyrene Phenol	4-Nitrophenol		11	"		50.0	ND	н	
Pentachlorophenol	N-Nitrosodiphenylamine	"	n	11		20.0	ND	**	
Phenanthrene	N-Nitrosodi-n-propylamine	ч	11	H		10.0	ND	n	
Phenol " " " 10.0 ND " 11.2.4-Trichlorobenzene " " " 10.0 ND " 12.4.5-Trichlorobenzene " " " 10.0 ND " 12.4.5-Trichlorophenol " " " 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol " " " " 10.0-141 10.0 ND " 12.4.6-Trichlorophenol "	Pentachlorophenol '	н	tt	H		50.0	ND	n	
Pyrene " " " " 10.0 268 " 1.2.4-Trichlorobenzene " " " " 10.0 ND " 2.4.5-Trichlorophenol " " " 10.0 ND " 2.4.5-Trichlorophenol " " " 10.0 ND " 2.4.6-Trichlorophenol " " " 10.0 ND " 2.4.6-Trichlorophenol " " " 10.0 ND " 2.4.6-Trichlorophenol " " " 10.0-141 3.99 % 9 Surrogate 2-FP " " " 19.0-141 3.99 " 9 Surrogate 2.4.6-TBP " " 10.0-137 27.9 " 2	Phenanthrene	ii.	11	e e		10.0	37.5	"	
10.0 ND   10.4-Trichlorobenzene	Phenol		11	11		10.0	ND	11	
2.4.5-Trichlorophenol       " " " " " 10.0 ND "         2.4.6-Trichlorophenol       " " " 19.0-141       3.99 % 9         Surrogate: 2-FP       " " 44.0-128       3.99 " 9         Surrogate: 2.4.6-TBP       " " " 10.0-137       27.9 "         Surrogate: Nurobenzene-d5       " " " 33.0-108       39.9 "         Surrogate: 2-FBP       " " " 51.0-124       87.8 "	Pyrene	"	11	"		10.0	268	"	
2.4.6-Trichlorophenol       " " " 19.0-141       3.99 % 9         Surrogate: 2-FP       " " 44.0-128       3.99 " 9         Surrogate: Phenol-d6       " " " 10.0-137       27.9 "         Surrogate: 2.4.6-TBP       " " " 33.0-108       39.9 "         Surrogate: Nurobenzene-d5       " " " 51.0-124       87.8 "	1.2.4-Trichlorobenzene	"	n	н		10.0	ND	"	
10.0   ND   ND   ND   ND   ND   ND   ND   N	2.4.5-Trichlorophenol			п		50.0	ND	"	
Surrogate. Phenol-d6       " " " 44.0-128 3.99 " 9         Surrogate: 2.4.6-TBP       " " " 10.0-137 27.9 "         Surrogate: Nurobenzene-d5       " " 33.0-108 39.9 "         Surrogate: 2-FBP       " " 51.0-124 87.8 "	2.4.6-Trichlorophenot	"	n	**		10.0	ND	"	
Surrogate: 2.4.6-TBP       " " " 10.0-137       27.9 "         Surrogate: Nurobenzene-d5       " " 33.0-108       39.9 "         Surrogate: 2-FBP       " " 51.0-124       87.8 "	Surrogate 2-FP	"	n ·	"	19.0-141		3.99	%	9
Surrogate: Ntrobenzene-d5 ." " " 33.0-108 39.9 " Surrogate: 2-FBP " " 51.0-124 87.8 "	Surrogate, Phenol-d6	"	"	"	44.0-128		3.99	"	9
Surrogate 2-FBP " " 51.0-124 87.8 "	Surrogate 2.4.6-TBP	"	"	"	10.0-137		27.9	**	
·	Surrogate. Nitrobenzene-d5	. "	"	"	33.0-108		39.9	"	
Surrogate. p-Terphenyl-d14 " " 48.0-149 148 "	Surrogate 2-FBP	"	"	"	51.0-124		87.8	"	
	Surrogate. p-Terphenyl-d14	"	"	"	48.0-149		148	"	

North Creek Analytical - Bothell

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Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98 Received: 8/21/98

600 University St., Suite 800 Seattle, WA 98101 Reported: 9/25/98 13:58 Project Manager: Carlotta Cellucci

Project Number: 10022-03

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
0.40.00 BH. TD0.00 01			<b>D</b> 0004				0.11	
8-20-98-BIL-TP9-SS-01	0000701	0/25/00	B8084	<u>  11-14</u>	2.50	2112	<u>Soil</u>	
Acenaphthene	0880681	8/25/98	8/27/98		2.50	ND	mg/kg dry "	
Acenaphthylene		"	"		2.50	ND		
Aniline		**	,,		2.50	ND		
Anthracene	·	"	"		2.50	ND		
Benzoic Acid	"	"	"		12.5	ND		
Benzo (a) anthracene	"	"			2.50	ND		8
Benzo (b) fluoranthene	"				2.50	ND		8
Benzo (k) fluoranthene		"	н		2.50	ND	"	8
Benzo (ghi) perylene	"	"	11		2.50	ND		8
Benzo (a) pyrene	**	H	n .		2.50	ND	"	8
Benzyl alcohol	"	"			2.50	ND	**	
Bis(2-chloroethoxy)methane	**	11-	ń		2.50	ND	11	
Bis(2-chloroethyl)ether	**	**	39		2.50	ND	11	
sis(2-chloroisopropyl)ether	11	H	**		2.50	ND	11	
Bis(2-ethylhexyl)phthalate	N .				12.5	ND	**	8
4-Bromophenyl phenyl ether	11	**	11		2.50	ND	"	
Butyl benzyl phthalate	**		**		2.50	ND	11	8
Carbazole	vi	•	**		12.5	ND	"	
4-Chloroaniline	•	**	ti .		2.50	ND	"	
2-Chloronaphthalene	ir .	"	11		2.50	ND	"	
4-Chloro-3-methylphenol	**		**		2.50	ND	ч	
2-Chlorophenol	•1		**		2.50	ND	••	
4-Chlorophenyl phenyl ether	11	**	. "		2.50	ND	11	
Chrysene	11				2.50	ND	U	8
Dibenz (a.h) anthracene	41	**	•		2.50	ND		8
Dibenzofuran	10	11	**		2.50	ND	11	
Di-n-butyl phthalate	41	H			12.5	ND	n ·	
1.3-Dichlorobenzene	•		14		2.50	ND	п	
1.4-Dichlorobenzene	+	n .	**		2.50	ND	"	
1.2-Dichlorobenzene	11	•	••		2.50	ND		
3.3'-Dichlorobenzidine	**		1+		125	ND	н	8
2.4-Dichlorophenol	•	P1			2.50	ND	n	U
Diethyl phthalate	11	"	**		2.50	ND ND	"	
2.4-Dimethylphenol	**	11			2.50	ND ND		
Dimethyl phthalate	11	11					**	
- ·	"	"	"		2.50	ND		
4.6-Dinitro-2-methylphenol		,,			12.5	ND	"	
2.4-Dinitrophenol	 ty	"	"		12.5	ND	,, H	
2.4-Dinitrotoluene	••		••		2.50	ND	"	

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600 University St., Suite 800

Project: Bradford Island Landfill

Sampled:

8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: Project Manager: Carlotta Cellucci

10022-03

Received: 8/21/98

9/25/98 13:58 Reported:

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
8-20-98-BIL-TP9-SS-01 (continued)			B8084	11-14			<u>Soil</u>	
2,6-Dinitrotoluene	0880681	8/25/98	8/27/98	<del></del>	2.50	ND	mg/kg dry	
Di-n-octyl phthalate		n	"		12.5	ND	"	8
Fluoranthene	**	11	**		2.50	ND		
Fluorene	11	н	**		2.50	ND	**	
Hexachlorobenzene	н	•	*r		2.50	ND	n	
Hexachlorobutadiene	n		11		2.50	ND	n	
Hexachlorocyclopentadiene	11		**		2.50	ND	II.	
Hexachloroethane	11		**		2.50	ND	"	
Indeno (1.2.3-cd) pyrene	"	H	**		2.50	ND	11	8
Isophorone	11	н	"		2.50	ND	11	
2-Methylnaphthalene	11	11	**		2.50	ND	,	
2-Methylphenol	"	"	**		2.50	ND	"	
3 & 4-Methylphenol	**	**	"		2.50	ND		
Naphthalene	**	••	**		2.50	ND	**	(
2-Nitroaniline	11		**		12.5	ND	11	<b>*</b>
3-Nitroaniline	11	"	**		12.5	ND	II .	
4-Nitroaniline	**	••	"		12.5	ND	н	
Nitrobenzene	**	"	"		2.50	ND	n .	
2-Nitrophenol	**	"	и		2.50	ND	и	
4-Nitrophenol	11	•	. "		12.5	ND	**	
N-Nitrosodiphenylamine	11	11	**		5.00	ND	H	
N-Nitrosodi-n-propylamine	**	11	**		2.50	ND	11	
Pentachlorophenol		**	••		12.5	ND	н	
Phenanthrene	11		**		2.50	ND	**	
Phenol	II .				2.50	ND	11	
Pyrene	"	"	"		2.50	ND	"	8
1.2.4-Trichlorobenzene	,,	•	н		2.50	ND	"	
2.4.5-Trichlorophenol	н	**	н		12.5	ND	н	
2.4.6-Trichlorophenol	Ħ	"			2.50	ND	0	
Surrogate: 2-FP	"	"	"	19.0-141		56.9	%	-
Surrogate: Phenol-d6	"	"	"	44.0-128		61.0	"	
Surrogate: 2.4.6-TBP	"	"	"	10.0-137		75.4	"	
Surrogate: Nurobenzene-d5	"	"	"	33.0-108		84.1	"	
Surrogate: 2-FBP	"	"	"	51.0-124		95.4	"	
Surrogate: p-Terphenyl-d14	"	"	"	48.0-149		103	"	

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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03 Project Manager: Carlotta Cellucci

Received: 8/21/98

Reported: 9/25/98 13:58

**Dry Weight Determination** North Creek Analytical - Bothell

Sample Name	Lab ID	Matrix	Result	Units
8-17-98-BIL-SB1-SS-01	B808411-01	Soil	85.3	%
8-18-98-BIL-BK1-SS-01	B808411-02	Soil	71.1	%
8-18-98-BIL-BK2-SS-01	B808411-03	Soil	82.4	%
8-18-98-BIL-BK3-SS-01	B808411-04	Soil	78.1	%
8-19-98-BIL-PW1-SS-01	B808411-05	Soil	84.1	%
8-19-98-BIL-TP1-SS-01	B808411-06	Soil	64.3	%
8-19-98-BIL-TP2-SS-01	B808411-07	Soil ·	86.9	%
-19-98-BIL-TP4-SS-01	B808411-08	Soil	71.4	%
8-20-98-BIL-TP6-SS-01	B808411-09	Soil	71.4	%
8-20-98-BIL-TP6-SS-02	B808411-10	Soil	66.4	%
8-20-98-BIL-TP5-SS-01	B808411-11	Soil	65.6	%
8-20-98-BIL-TP8-SS-01	13808411-12	Soil	87.1	%
8-20-98-BIL-TP7-SS-01	B808411-13	Soil	92.7	%
8-20-98-BIL-TP9-SS-01	B808411-14	Soil	85.3	%

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Project.

Bradford Island Landfill

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600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/25/98 13:58

# Hydrocarbon Identification by Washington DOE Method NWTPH-HCID/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	R	eporting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0880628	Date Prepa	red: 8/24/9	<u>98</u>		Extraction	on Method: HC	ID (WA)	ŀ	
<u>Blank</u>	0880628-BI	<u>∡K1</u>							
Gx Range Hydrocarbons	8/25/98			ND	mg/kg dr	y <b>20.0</b>			
Kerosene Range Hydrocarbons	"			ND	11	50.0			
Diesel Range Hydrocarbons	**			ND	11	50.0			
Insulating Oil Range Hydrocarbons	••			ND	н	100			
Heavy Fuel Oil Range Hydrocarbons	**			ND	11	100			
Lube Oil Range Hydrocarbons	11			ND	**	100			
Surrogate. 2-FBP	" .	DET		DET	"	50.0-150	95.6		·•

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Joy B Chang Project Manager

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600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

# Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	R	eporting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0880788	<u>Date Prepa</u>	red: 8/27/5	<u>98</u>		Extraction	on Method: EPA	A 3550B		
<u>Blank</u>	0880788-BI	LK1							
Diesel Range Hydrocarbons	8/28/98			ND	mg/kg dr	y <b>10.0</b>			
Lube Oil Range Hydrocarbons	•			ND	"	25.0			
Surrogate: 2-FBP	"	11.0		5.91	"	50.0-150	53.7		•
LCS	0880788-BS	81							
Diesel Range Hydrocarbons	8/28/98	66.7		55.6	mg/kg dr	y 60.0-140	83.4		•
Surrogate: 2-FBP	"	11.0		11.0	"	50.0-150	100		
<u>Duplicate</u>	0880788-DI	<u>UP1 B8</u>	308411-13						
Diesel Range Hydrocarbons	9/1/98		1900	1820	mg/kg dr	y		50.0	4.30
Lube Oil Range Hydrocarbons	**		2790	2730	11			50.0	2.17
Surrogate: 2-FBP	,,	11.8		11.4		50.0-150	96.6		

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Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

10022-03 Project Number:

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	F	Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
D-4-b- 0000020	D . D		,		<b>.</b>	Mal 1 ED	. 3050B			
Batch: 0980038	Date Prepar		5		<u>£xtracti</u>	on Method: EP	A 3050B			
Biank	0980038-BL	<u>Ki</u>		NID		0.500				
Antimony	9/3/98			ND	mg/kg dr					
Arsenic	,			ND	"	0.500				
Barium	,			ND		5.00				
Beryllium				ND	.,	0.500				
Chamium				ND	,,	0.500				
Calada				ND	"	0.500				
Cobalt				ND	11	0.500				
Copper				ND	"	0.500				
Lead	.,			ND	"	0.500				
Manganese				ND		0.500				
Nickel				ND		0.500				_
Selenium	**			ND	"	0.500				(
Silver	,,			ND	"	0.500				
Thallium	"			ND	"	0.500				
Vanadium			•	ND	"	0.500				
Zinc	11			ND	"	5.00				
LCS	0980038-BS	1								
Antimony	9/3/98	25.0		22.5	mg/kg di	y 80.0-120	90.0			
Arsenic	•	25.0		21.0	**	70.0-130	84.0			
Barium .	u	25.0		23.8	"	80.0-120	95.2			
Beryllium	9/4/98	25.0		21.6	н	80.0-120	86.4			
Cadmium	9/3/98	25.0		20.4	n	70.0-130	81.6			
Chromium	**	25.0		22.8	**	80.0-120	91.2			
Cobalt	•	25.0		22.5	11	80.0-120	90.0			
Copper	**	25.0		23.5	**	80.0-120	94.0			
1.ead		25.0		24.0	19	80.0-120	96.0			
Manganese		25.0		23.2	11	80.0-120				
Nickel	•	25.0		21.8	ti	80.0-120				
Selenium		25.0		19.0		70.0-130				
Silver	**	25.0		21.8	11	80.0-120				
Thallium	. "	25.0		24.6	ų	80.0-120				
Vanadium	••	25.0		22.8	n,	80.0-120				
Zine	**	25.0		21.6	"	70.0-130				
<u>Duplicate</u>	0980038-DU	P1 B8	308411-08							
Antimony	9/3/98		ND	ND	mg/kg di	rv		20.0		

North Creek Analytical - Bothell

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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled:

8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98 Reported:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

Analyte	Analyzed		Sample	QC		porting Limit		RPD	RPD	
	Allalyzeu	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Dunlingto (soutinued)	0000030 7111	nı n	0000411.00							
<b>Duplicate (continued)</b> Arsenic	<u>0980038-DUI</u> 9/3/98	रा ह	2.18	3.98	ma/lia da			20.0	58.4	10
Barium	9/3/98		2.18 84.6	3.96 117	mg/kg dry			20.0	32.1	11
Beryllium	11		84.6 ND	ND	**			20.0	32.1	1.
Cadmium	,,		ND ND	1.18	**			20.0		10
Chromium	,,		9.12	11.8	11			20.0	25.6	11
Cobalt			8.28	9.86	,,			20.0	17.4	11
Copper	11		28.5	39.7	n			20.0	32.8	11
Lead	n .		189	239	11			20.0	23.4	12
Manganese	"		273	361				20.0	27.8	12
Nickel			14.0	15.7	**			20.0	11.4	12
Selenium	**		ND	ND	.,			20.0	11.7	
Silver	**		ND ND	ND	11			20.0		
Thallium	"		ND ND	ND				20.0		
Vanadium	*1		34.3	43.2			•	20.0	23.0	11
Zinc	u .		57.9	94.3	**			20.0	47.8	12
ZIIIC			31.9	94.3				20.0	4.7.0	14
Matrix Spike	0980038-MS1		808411-08							
Antimony	9/3/98	31.9	ND	5.35	mg/kg dry	70.0-130	16.8			13
Arsenic	11	31.9	2.18	28.8		70.0-130	83.4			
Barium	O.	31.9	84.6	126	**	70.0-130	130		-	
Beryllium	II .	31.9	ND	29.8		70.0-130	93.4			
Cadmium	ii .	31.9	ND	28.3	**	70.0-130	88.7			
Chromium	•	31.9	9.12	36.0	"	70.0-130	84.3			
Cobalt	II .	31.9	8.28	35.5	11	70.0-130	85.3			
Copper .	"	31.9	28.5	62.4	n	70.0-130	106			
Lead		31.9	189	197	н	70.0-130	25.1			13
Manganese	R	31.9	273	405	**	70.0-130	NR			14
Nickel	••	31.9	14.0	39.4	н	70.0-130	79.6			
Selenium	•	31.9	ND	22.6	11	70.0-130	70.8			
Silver	**	31.9	ND	28.3	11	70.0-130	88.7			
Thallium	ч	31.9	ND	31.5	••	70.0-130	98.7			
Vanadium	11	31.9	34.3	66.9	··	70.0-130	102			
Zine	."	31.9	57.9	100	IJ	70.0-130	132			13
<u>Matrix Spike</u>	0980038-MS2	<u>2</u> R	808411-08	•						
Antimony	9/4/98	604	ND	598	mg/kg dry	70.0-130	99.0			15
Lead	9	604	189	822	mg/kg dry	70.0-130	105			15
Manganese	••	604	273	954		70.0-130	113			15

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Tetra Tech. Inc.

600 University St., Suite 800

Seattle, WA 98101

Project:

Bradford Island Landfill

Sampled

8/17/98 to 8/20/98

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Received: 8/21/98

Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	Rep	orting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	_	Recov. Limits	%	Limit	% Notes*
					<del>-</del>				
Matrix Spike (continued)	<u>0980038-M</u>		<u>808411-08</u>						
Zinc	-9/3/98	604	57.9	663	mg/kg dry	70.0-130	100		15
Batch: 0980054	Date Prepa	red: 9/2/98	3		Extraction	Method: EP	4 7471A		
<b>Blank</b>	0980054-BI	<u>_K1</u>							
Mercury	9/3/98			ND	mg/kg dry	0.100			
LCS	0980054-BS	<u> </u>							
Mercury	9/3/98	1.00		2.26	mg/kg dry	80.0-120	NR		16
Matrix Spike	0280054-M	S1 B8	308411-12						
Mercury	9/3/98	0.526	3.50	2.66	mg/kg dry	80.0-120	NR		14
Matrix Spike Dup	0980054-M	SD1 B	308411-12						
Mercury	9/3/98	0.546	3.50	2.92	mg/kg dry	80.0-120	NR	20.0	<u>_</u> +
Batch: 0980293	Date Prepa	red: 9/11/9	98		Extraction	Method: EP	A 3050B		
Blank	0980293-B1				<u> </u>				
Aluminum	9/10/98			ND	mg/kg dry	10.0			
Calcium	н			ND	"	15.0			
Iron	te .			10.6		8.00			·
Magnesium	•			ND	**	10.0			
Potassium ·	9/11/98			17.8	· ·	10.0			
Sodium	9/17/98			ND	**	25.0			
LCS	0980293-BS	61							
Aluminum	9/10/98	5720		4690	mg/kg dry	70.0-130	82.0		
Calcium	•	1280		1310	"	70.0-130	102		
Iron		9080		7390	"	70.0-130	81.4		
Magnesium	•	1210		1230	n	70.0-130	102		
Potassium	9/11/98	1500		1690	11	70.0-130	113		16
Sodium	9/17/98	1380		1830	**	70.0-130	133		16
Matrix Spike	0980293-MS	S1 B8	3 <u>08411-08</u>						
Aluminum	9/10/98	65.5	11200	12400	mg/kg dry	70.0-130	NR		14
Calcium	"	65.5	6610	6370	"	70.0-130	NR		14
Iron	**	65.5	21500	18400	11	70.0-130	NR		14
Magnesium	19	65.5	7070	7010	n	70.0-130	NR		14

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definite

18939 120th Avenue N E . Suite 101. Bothell. WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND (503) 906-9200 FAX 906-9210

Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Project: Bradford Island Landfill

Sampled:

8/17/98 to 8/20/98

Project Number: 10022-03 Project Manager: Carlotta Cellucci

Received:

8/21/98 Reported: 9/25/98 13:58

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	Re	porting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Matrix Spike (continued)	0980293-M	<u>S1 B</u>	808411-08		• •					
Sodium	9/17/98	65.5	585	834	mg/kg dry	70.0-130	NR			14
Matrix Spike Dup	0980293-M	SD1 B	808411-08							
Aluminum	9/17/98	64.3	11200	12700	mg/kg dry	70.0-130	NR	20.0	NR	14
Calcium	н	64.3	6610	6850	u .	70.0-130	NR	20.0	NR	14
Iron	"	64.3	21500	18000	"	70.0-130	NR	20.0	NR	14
Magnesium	n	64.3	7070	7260	n	70.0-130	NR	20.0	NR	14
Sodium	9/17/98	64.3	585	997	11	70.0-130	NR	20.0	51.1	14
Batch: 0980564	Date Prepa	red: 9/9/98	<u>8</u>		Extraction	Method: EP	<u>A 3050B</u>			
<u>Blank</u>	<u>0980564-BL</u>	<u>.K1</u>								
Potassium	9/10/98			ND	mg/kg dry	10.0				
<u>Lcs</u>	0980564-BS	1							۳	
Potassium	9/10/98	1500		1130	mg/kg dry	70.0-130	75.3			
Matrix Spike	0980564-MS	SI RI	808 <u>411-08</u>						v	
Potassium	9/10/98	615	723	1020	mg/kg dry	70.0-130	48.3			14
Matrix Spike Dup	0980564-MS	SD1 R	<u>808411-08</u>							
Potassium	9/10/98	599	723	1300	mg/kg dry	70.0-130	96.3	20.0	66.4	

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Batch: 0980053	Date Prepa		<u> </u>		<u>Extrac</u>	tion Method: EP	<u>4_7470A</u>			
Blank	0980053-BI	<u>_K1</u>								
Mercury	9/3/98			ND	mg/l	0.00100				
LCS	0980053-BS	<u> </u>								
Mercury <sup>-</sup>	9/3/98	0.00500		0.00494	mg/l	80.0-120	98.8			
Matrix Spike	0980053-M	S1 B8	308411-07							
Mercury	9/3/98	0.0100	ND	0.0102	mg/l	80.0-120	102			
Matrix Spike Dup	<u>0980053-M</u>	SD1 B8	30 <b>8411-</b> 07							
Mercury	9/3/98	0.0100	ND	0.00996	mg/l	80.0-120	99.6	20.0	2.38	
Batch: 0980288	<u>Date Prepa</u>	red: 9/9/98	3		Extrac	tion Method: EP.	A 3020A			
Blank	0980288-BI		-						•	
Antimony	9/17/98			ND	mg/l	0.100				
Arsenic	9/15/98			ND	"	0.200				
Barium	u u			ND	**	1.00				
Beryllium	9/17/98			ND		0.00500				
Cadmium	9/15/98			ND	n	0.00500				
Chromium	11			ND	"	0.0100				
Cobalt	"			ND	**	0.0100				
Copper	11			ND		0.0300				
Lead	u			ND	"	0.200				
Manganese	"			ND	**	0.00500				
Nickel	**			ND	"	0.0300				
Selenium	n			ND	"	0.150				
Silver	11			ND	**	0.0500				
Thallium	ti			ND	••	0.200				
Vanadium	"			ND		0.200				
Zine				ND	"	0.0500				
LCS	0980288-BS	S1								
Antimony	9/15/98	1.00		0.904	mg/l	80.0-120	90.4			
Arsenic	"	1.00		1.12	"	80.0-120	112			
Barium	9/17/98	5.00		ND	•	80.0-120	NR			13
Beryllium	9/18/98	1.00		0.926	**	80.0-120	92.6			13
Cadmium	9/15/98	1.00		1.08	,,	80.0-120	108			
Chromium	9/ t 3/ 70	1.00		1.08	**	80.0-120	101			
Chromium		1.00		1.01		80.0-120	101			

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang Project Manager

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PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	<del></del>	Reporting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
LCS (continued)	0980288-BS	<u> </u>							
Cobalt	9/15/98	1.00		0.990	mg/l	80.0-120	99.0		
Copper	n	1.00		1.00	"	80.0-120	100		
Lead	н	1.00		1.02	**	80.0-120	102		
Manganese	n .	1.00		1.00	"	80.0-120	100		
Nickel	9	1.00		1.03	**	80.0-120	103		
Selenium	n	1.00		1.19	**	80.0-120	119		
Silver	11	0.500		0.507		80.0-120	101		
Thallium	11	1.00		0.995		80.0-120	99.5		
Vanadium	"	1.00		1.00		80.0-120	100	·	
Zinc	"	1.00		1.16	· n	80.0-120	116		•
Matrix Spike	<u>0980288-M</u>	<u>S1 B8</u>	<u> 308411-13</u>						
Antimony	9/15/98	1.00	ND	0.892	mg/l	80.0-120	89.2		
Arsenic	Ü	1.00	ND	1.10	"	80.0-120	110		
Barium	19	5.00	ND	5.16	**	80.0-120	103		
Beryllium	9/18/98	1.00	ND	0.856	н	80.0-120	85.6		
Cadmium	9/15/98	1.00	ND	1.10		80.0-120	110		
Chromium	•	1.00	ND	0.990	II	80.0-120	99.0		
Cobalt	"	1.00	ND	0.985	**	80.0-120	98.5		
Copper	11	1.00	ND	1.02	**	80.0-120	102		
Lead	ij	1.00	1.35	2.36	11	80.0-120	101		
Manganese	н	1.00	0.0445	1.03	0	80.0-120	98.5		
Nickel	11	1.00	ND	1.01		80.0-120	101		
Selenium	•	1.00	ND	1.17	n	80.0-120	117		
Silver	0	0.500	ND	0.515	11	80.0-120	103		
Thallium	"	1.00	ND	0.965	"	80.0-120	96.5		
√anadium	"	1.00	ND	0.960	**	80.0-120	96.0		
Line	•	1.00	ND	1.20	H	80.0-120	120		
Matrix Spike Dup	<u>0980288-M5</u>	SD1 <u>B8</u>	308411-13						
Antimony	9/15/98	1.00	ND	0.914	mg/l	80.0-120	91.4	20.0	2.44
Arsenic	"	1.00	ND	1.07	"	80.0-120	107	20.0	2.76
Barium	11	5.00	ND	5.32	**	80.0-120	106	20.0	2.87
Beryllium	9/18/98	1.00	ND	0.984	"	80.0-120	98.4	20.0	13.9
admium	9/15/98	1.00	ND	1.10	•	80.0-120	110	20.0	0
Thromium	D	1.00	ND	1.00	**	80.0-120	100	20.0	1.01
lobalt	"	1.00	ND	1.02	"	80.0-120	102	20.0	3.49
Copper	**	1.00	ND	1.02	"	80.0-120	102	20.0	0

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manager

18939 120th Avenue N.E. Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc. 600 University St., Suite 800 Project:

Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

10022-03 Project Number:

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### SPLP Metals by EPA 1311/6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit		RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u>	Limit	%	Notes*
Matrix Spike Dup (continued)	0980288-M	SD1 B	308411- <u>13</u>							
Lead	9/15/98	1.00	1.35	2.35	mg/l	80.0-120	100	20.0	0.995	
Manganese	••	1.00	0.0445	1.01	**	80.0-120	96.5	20.0	2.05	
Nickel	n	1.00	ND	1.02	"	80.0-120	102	20.0	0.985	
Selenium	н	1.00	ND	1.15	n	80.0-120	115	20.0	1.72	
Silver	**	0.500	ND	0.505	**	80.0-120	101	20.0	1.96	
Thallium	"	1.00	ND	0.970	**	80.0-120	97.0	20.0	0.517	
Vanadium	**	1.00	ND	0.985	"	80.0-120	98.5	20.0	2.57	
Zinc	н	1.00	ND	1.15	11	80.0-120	115	20.0	4.26	
Batch: 0980291	Date Prepa		<u>3</u>		Extrac	tion Method: EP	A 3010A	TCLP		
<u>Blank</u>	<u>0980291-B</u>	<u>LK1</u>								
Aluminum	9/10/98			ND	mg/l	0.500				_
Calcium	n			ND	"	0.250				
Iron	"			ND	**	0.150				<u> </u>
Magnesium	n			ND	11	0.500				
Potassium	0			ND	"	0.200	•			
Sodium	11			ND	"	0.500				
LCS	0980291-BS	<u>S1</u>								
Aluminum	9/10/98	1.00		1.00	mg/l	80.0-120	100			
Calcium	••	1.00		0.991	17	80.0-120	99.1			
Iron ·	•	1.00		1.03	"	80.0-120	103			
Magnesium	**	1.00		0.983	н	80.0-120	98.3			
Potassium	**	10.0		9.60	11	80.0-120	96.0			
Sodium	"	1.00		1.03	11	80.0-120	103			
Matrix Spike	0980291-M	<u>S1</u> <u>B</u> 8	<u>808411-13</u>							
Aluminum	9/11/98	1.00	2.06	3.16	mg/l	80.0-120	110			
Calcium	•	1.00	1.52	2.58	•	80.0-120	106			
Iron	11	1.00	3.96	5.11	н	80.0-120	115			
Magnesium	n	1.00	ND	1.51	"	80.0-120	151			
Potassium	II .	10.0	0.657	10.8		80.0-120	101			
Sodium	tt	1.00	22.3	23.2	"	80.0-120	90.0			
Matrix Spike Dup	0980291-M	SD1 B	808411-13							
Aluminum	9/11/98	1.00	2.06	3.18	mg/l	80.0-120	112	20.0	1.80	
Calcium	**	1.00	1.52	2.62	"	80.0-120	110	20.0	3.70	
		1.00	3.96	4.90	11	80.0-120	94.0	20.0	20.1	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defining

Joy B Chang, Pro eet Manager

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PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc. Project: Bradford Island Landfill Sampled: 8/17/98 to 8/20/98 600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98

600 University St., Suite 800 Project Number: 10022-03 Received: 8/21/98
Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### SPLP Metals by EPA 1311/6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov.	RPD Limit	RPD %	Notes*
Matrix Spike Dup (continued)	0980291-M	SD1 <u>B8</u>	308411 <u>-13</u>							
Magnesium	9/11/98	1.00	ND	1.50	mg/l	80.0-120	150	20.0	0.664	
Potassium	n	10.0	0.657	11.0	11	80.0-120	103	20.0	1.96	
Sodium	н	1.00	22.3	23.7	11	80.0-120	140	20.0	43.5	14

forth Creek Analytical - Bothell





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Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Project Number: 10022-03 Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	R	Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit		Notes*
					-	<u></u>				
Batch: 0880705	<u>Date Prepa</u>	red: 8/25/9	<u>98</u>		Extraction	on Method: EPA	3550B			
<u>Blank</u>	0880705-BI	L <u>K1</u>								<u>2</u>
Aldrin	9/22/98			ND	ug/kg dry	1.00				
alpha-BHC	"			ND	"	0.500				
beta-BHC	н			ND		0.900				
delta-BHC	н			ND	11	0.600				
gamma-BHC (Lindane)	n			ND	**	1.00				
Chlordane (tech)	n			ND	н	1.00				
alpha-Chlordane	11			ND	н	0.800				
gamma-Chlordane	"			ND	"	0.700				
4.4´-DDD				ND	"	1.00				
4.4'-DDE	**			ND	**	1.00				
4.4'-DDT	"			ND	11	1.00				
Dieldrin	•			ND	11	2.00				
Endosulfan l	n .			ND		1.00				(
Endosulfan II	н			ND		2.00				
Endosulfan sulfate				ND	11	1.00				
Endrin	"			ND	**	2.00				
Endrin aldehyde	"			ND	**	2.00				
Heptachlor	**			ND	11	1.00				
Heptachlor epoxide	"			ND	H	1.00				
Methoxychlor	11			ND	**	4.00			•	
Toxaphene	19			ND	n	50.0				
Aroclor 1016	11			ND	п	50.0				
Aroclor 1221	"			ND	•	50.0				
Aroclor 1232	11			ND	••	50.0				
Aroclor 1242	"			ND		50.0				
Aroclor 1248	**			· ·	**	50.0				
Aroclor 1254	**			ND						
Aroclor 1260	,,			ND	11	50.0				
Aroclor 1262	**			ND	11	50.0				
	"			ND	n n	50.0				
Aroclor 1268				ND	<del>-</del> ,	50.0				
Surrogate: TCX	<i>"</i>	6.6		5.75	"	40.0-130	86.2			
LCS	0880705-BS	<u> </u>								2
Aldrin	9/22/98	8.33		8.97	ug/kg dry	35.0-138	108			_
gamma-BHC (Lindane)	11	8.33		9.32	"	44.0-137	112			
Heptachlor	n	8.33		9.74	**	40.0-146	117			
Aroclor 1260		333		246	11	28.0-132	73.9			
				2.0		_5.0 ·5 <b>2</b>				

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and define

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Tetra Tech. Inc.

Project:

Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

600 University St.. Suite 800

Project Number: 10022-03

8/21/98 Received:

Seattle, WA 98101

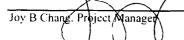
Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082/Quality Control North Creek Analytical - Bothell

·	Date	Spike	Sample	QC	R	eporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u>	Limit	<u>%</u>	Notes*
LCS (continued)	0880705-BS	<u>81</u>								
Surrogate: TCX	9/22/98	6.67		5.93	ug/kg dry	40.0-130	88.9		·	
Matrix Spike	0880705-M	<u>S1 B</u>	808411-07							2
Aldrin	9/22/98	9.59	ND	7.24	ug/kg dry	35.0-138	75.5			
gamma-BHC (Lindane)	H	9.59	ND	8.66	"	44.0-137	90.3			
Heptachlor	п	9.59	ND	9.28	n	40.0-146	96.8			
Aroclor 1260	"	383	ND	310	"	44.0-123	80.9			
Surrogate TCX	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	7.67		5.81	<del></del> ;	40.0-130	75.7			
Matrix Spike Dup	0880705-M	SD1 B	808411-07							2
Aldrin	9/22/98	9.59	ND	7.32	ug/kg dry	35.0-138	76.3	33.0	1.05	
gamma-BHC (Lindane)	11	9.59	ND	8.88	"	44.0-137	92.6	35.0	2.52	
leptachlor	**	9.59	ND	10.1	"	40.0-146	105	32.0	8.13	
roclor 1260		383	ND	382	"	44.0-123	99.7	23.0	20.8	
Surrogate: TCX		7.67		5.89		40.0-130	76.8			

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 100

10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: (

Carlotta Cellucci

Reported: 9/25/98 13:58

# Chlorinated Herbicides by EPA Method 8151A/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	R	eporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Batch: 0880759	Date Prepa	red: 8/26/9	<u>98</u>		Extraction	n Method: EPA	<u> </u>			
<u>Blank</u>	0880759-BI	<u>LK1</u>								
2.4-D	9/2/98			ND	ug/kg dry	5.00				
2.4-DB				ND	н .	20.0				
2.4,5-T	tt			ND	11	20.0				
2.4.5-TP (Silvex)	н			ND	"	20.0				
Dalapon	"			ND	"	80.0				6
Dicamba	n			ND	"	5.00				
Dichlorprop	**			ND	"	15.0				
Dinoseb	н			ND	••	45.0				3
MCPA	"			ND	11	750				
МСРР	н			ND	"	750				
Surrogate: 2,4-DCAA		333		258	,,	31.0-136	77.5			
LCS	0880759-BS	S1								
2.4-D	9/2/98	100		93.2	ug/kg dry	41.0-141	93.2			
2,4,5-TP (Silvex)	**	100		92.8	וו	51.0-116	92.8			
Surrogate: 2,4-DCAA	"	333		299		31.0-136	89.8	· . <u></u>		
LCS Dup	0880759-BS	SD1								
2.4-D	9/2/98	100	•	109	ug/kg dry	41.0-141	109	44.0	15.6	
2.4.5-TP (Silvex)	11	100		96.5	"	51.0-116	96.5	27.0	3.91	
Surrogate: 2.4-DCAA	"	333		291		31.0-136	87.4	·- ·		

North Creek Analytical - Bothell





PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.
Project: Bradford Island Landfill
Sampled: 8/17/98 to 8/20/98
600 University St., Suite 800
Project Number: 10022-03
Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### Volatile Organic Compounds by EPA Method 8260B/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	F	Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u>	Limit	% N	votes*
D-4-L. 000000	Data Bura		no.		F44:	on Method: EP	4 5030B	IM <sub>6</sub> OUI		
Batch: 0880906	Date Prepa		<u>98</u>		EXTRACTI	on Method: Er	A SUSUB	INCOM		
Blank	0880906-BJ	'KI		ND	مرم الرميط	ry 2.00				
Acetone	8/31/98			ND ND	mg/kg di "	0.100				
Benzene	,,			ND	**					
Bromobenzene				ND	,,	0.100				
Bromochloromethane				ND		0.100				
Bromodichloromethane			•	ND	 H	0.100				
Bromoform	,,			ND	,,	0.100				
Bromomethane	"			ND		0.100				
2-Butanone	"			ND		2.00				
n-Butylbenzene				ND	**	0.100				
sec-Butylbenzene	n			ND		0.100				
tert-Butylbenzene	11			ND	Į)	0.100				
Carbon disulfide	"			ND	11	0.100				
Carbon tetrachloride	*1			ND	"	0.100			_	
Chlorobenzene	II .			ND	11	0.100				
Chloroethane	**			ND	**	0.100				
Chloroform	**			ND	11	0.100				
Chloromethane	"			ND	11	0.500				
2-Chlorotoluene	**			ND	n	0.100				
4-Chlorotoluene	**			ND	o o	0.100				
Dibromochloromethane	н			ND	n .	0.100				
1.2-Dibromo-3-chloropropane				ND	11	1.00				
1.2-Dibromoethane	"			ND	11	0.100				
Dibromomethane	n			ND	"	0.100				
1.2-Dichlorobenzene				ND	11	0.100				
1.3-Dichlorobenzene	n			ND	11	0.100				
1.4-Dichlorobenzene				ND	11	0.100				
Dichlorodifluoromethane				ND		0.100				
1.1-Dichloroethane	**			ND	н	0.100				
1.2-Dichloroethane	n			ND	11	0.100				
1.1-Dichloroethene	•			ND	10	0.100				
cis-1,2-Dichloroethene	"			ND		0.100				
trans-1,2-Dichloroethene				ND ND		0.100				
						0.100				
1.2-Dichloropropane	**			ND ND	19					
1.3-Dichloropropane				ND	n	0.100				
2.2-Dichloropropane	. "			ND	"	0.100				
1.1-Dichloropropene	"			ND	"	0.100				
cis-1,3-Dichloropropene	"			ND	"	0.100	-			

Forth Creek Analytical - Bothell





PORTLAND - (503) 906-9200 - FAX 906-921

Tetra Tech. Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

9/25/98 13:58

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

10022-03 Received: 8/21/98 Carlotta Cellucci Reported:

Volatile Organic Compounds by EPA Method 8260B/Quality Control

# North Creek Analytical - Bothell

p-Isopropyltoluene "		Date	Spike	Sample	QC	-	orting Limit	Recov.	RPD	RPD	
Irans 1.3 Dichloropropene	Analyte	Analyzed	Level	Result	Result	Units R	ecov. Limits	%	Limit	% No	otes*
Irans 1.3 Dichloropropene	Blank (continued)	0880906-B1	LK1								
Ethylbenzene " ND " 0.100   Hexachlorobutadiene " ND " 0.100   2-Hexanone " ND " 0.100   2-Hexanone " ND " 0.100   2-Hexanone " ND " 0.100   2-Hexanone   ND " 0.100   2-Hexan					ND	mg/kg dry	0.100				
Hexachlorobutadiene											
2-Hexanone	•	**				85					
Sopropylbenzene		11				**					
p-Isopropyltoluene " ND " 0.100 Methylene chloride " ND " 1.00 1.00 Methylene chloride " ND " 1.00 1.00 ND " 1.00 ND " 1.00 ND " 2.00 Naphthalene " ND " 0.100 ND " 0.100 ND " 0.100 ND " 0.100 ND " 0.100 ND ND " 0.100 ND ND " 0.100 ND ND " 0.100 ND ND " 0.100 ND ND " 0.100 ND ND ND ND ND ND ND ND ND ND ND ND ND	Isopropylbenzene	"			ND	**					
Methylene chloride         "         ND         "         1.00           4-Methyl-2-pentanone         "         ND         "         2.00           Naphthalene         "         ND         "         0.100           n-Propylbenzene         "         ND         "         0.100           Styrene         "         ND         "         0.100           1.1.1.2-Tetrachloroethane         "         ND         "         0.100           1.1.2.2-Tetrachloroethane         "         ND         "         0.100           1.2.2-Trichloroethane         "         ND         "         0.100           1.2.3-Trichlorobenzene         "         ND         "         0.100           1.2.4-Trichlorobenzene         "         ND         "         0.100           1.1.1-Trichlorobenzene         "         ND         "         0.100           1.1.2-Trichloroethane         "         ND         "         0.100		••			ND	**					
A-Methyl-2-pentanone   "		**			ND	II.					
Naphthalene	-	"				II					
ND		**				10					
Styrene	· · · · ·	•				"					
1.1.2-Tetrachloroethane		"				"					
1.1.2.2-Tetrachloroethane	•										
Tetrachloroethene						11					~
Toluene " ND " 0.100 1.2.3-Trichlorobenzene " ND " 0.100 1.2.4-Trichlorobenzene " ND " 0.100 1.1.1-Trichloroethane " ND " 0.100 1.1.1-Trichloroethane " ND " 0.100 1.1.2-Trichloroethane " ND " 0.100 Trichloroethene " ND " 0.100 Trichloroethane " ND " 0.100 Trichlorofluoromethane " ND " 0.100 1.2.3-Trichloropropane " ND " 0.100 1.2.3-Trimethylbenzene " ND " 0.100 1.2.4-Trimethylbenzene " ND " 0.100 1.3.5-Trimethylbenzene " ND " 0.100 1.3.5-Trichloroethene " 1.00 0.931 mg/kg dry 70.0-130 93.3 1.1-Dichloroethene " 1.00 0.951 " 70.0-130 95.1 1.1-Dichloroethene " 1.00 0.773 " 70.0-130 95.1 1.1-Dichloroethene " 1.00 0.773 " 70.0-130 77.3 1.1-Dichloroethene " 1.00 0.773 " 70.0-130 77.3		••				"				ę	
1.2.3-Trichlorobenzene		п								`	
1.2.4-Trichloroethane	1.2.3-Trichlorobenzene	n									
1.1.1-Trichloroethane						"					
1.1.2-Trichloroethane		н				,,					
Trichloroethene											
Trichlorofluoromethane " ND " 0.100 1.2.3-Trichloropropane " ND " 0.100 1.2.4-Trimethylbenzene " ND " 0.100 1.3.5-Trimethylbenzene " ND " 0.100 1.3.5-Trimethylbenzene " ND " 0.100 1.3.5-Trimethylbenzene " ND " 0.100 Vinyl chloride " ND " 0.100  Winyl chloride " ND " 0.200  o-Xylene " ND " 0.200  o-Xylene " 2.00 1.91 " 70.0-130 95.5  Surrogate: 2-Bromopropene " 2.00 1.91 " 70.0-130 99.5  Surrogate: 1.2-DCA-d4 " 2.00 1.99 " 70.0-130 99.5  Surrogate: 4-BFB " 2.00 1.99 " 70.0-130 96.0  LCS  Benzene 8/31/98 1.00 0.933 mg/kg dry 70.0-130 93.3  Chlorobenzene " 1.00 0.951 " 70.0-130 95.1  1.1-Dichloroethene " 1.00 0.773 " 70.0-130 95.1  Toluene " 1.00 0.884 " 70.0-130 88.4		n									
1.2.3-Trichloropropane       "       ND       "       0.100         1.2.4-Trimethylbenzene       "       ND       "       0.100         1.3.5-Trimethylbenzene       "       ND       "       0.100         Vinyl chloride       "       ND       "       0.100         m.p-Xylene       "       ND       "       0.200         o-Xylene       "       2.00       1.91       "       70.0-130       95.5         Surrogate: 2-Bromopropene       "       2.00       1.99       "       70.0-130       99.5         Surrogate: 1.2-DCA-d4       "       2.00       1.99       "       70.0-130       99.5         Surrogate: 4-BFB       "       2.00       1.99       "       70.0-130       96.0         LCS       0880906-BS1       "       2.00       1.92       "       70.0-130       93.3         Chlorobenzene       "       1.00       0.933       mg/kg dry       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4		11									
1.2.4-Trimethylbenzene       "       ND       "       0.100         1.3.5-Trimethylbenzene       "       ND       "       0.100         Vinyl chloride       "       ND       "       0.100         m.p-Xylene       "       ND       "       0.200         o-Xylene       "       ND       "       0.100         Surrogate: 2-Bromopropene       "       2.00       1.91       "       70.0-130       95.5         Surrogate: 1.2-DCA-d4       "       2.00       1.99       "       70.0-130       99.5         Surrogate: 1-2-BFB       "       2.00       1.99       "       70.0-130       96.0         LCS       0880906-BS1         Benzene       8/31/98       1.00       0.933       mg/kg dry       70.0-130       93.3         Chlorobenzene       "       1.00       0.951       "       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4		n				и					
ND	- · ·	н				**					
Vinyl chloride         "         ND         "         0.100           m.p-Xylene         "         ND         "         0.200           o-Xylene         "         ND         "         0.100           Surrogate: 2-Bromopropene         "         2.00         1.91         "         70.0-130         95.5           Surrogate: 1.2-DCA-d4         "         2.00         1.99         "         70.0-130         99.5           Surrogate: Toluene-d8         "         2.00         1.99         "         70.0-130         99.5           Surrogate: 4-BFB         "         2.00         1.92         "         70.0-130         96.0           LCS         0880906-BS1         Benzene         8/31/98         1.00         0.933         mg/kg dry         70.0-130         93.3           Chlorobenzene         "         1.00         0.951         "         70.0-130         95.1           1.1-Dichloroethene         "         1.00         0.773         "         70.0-130         77.3           Toluene         "         1.00         0.884         "         70.0-130         88.4		"				"					
m.p-Xylene "		н									
ND         "         0.100           Surrogate: 2-Bromopropene         "         2.00         1.91         "         70.0-130         95.5           Surrogate: 1.2-DCA-d4         "         2.00         1.99         "         70.0-130         99.5           Surrogate: Toluene-d8         "         2.00         1.99         "         70.0-130         99.5           Surrogate: 4-BFB         "         2.00         1.92         "         70.0-130         96.0           LCS         0880906-BS1         Benzene         8/31/98         1.00         0.933         mg/kg dry         70.0-130         93.3           Chlorobenzene         "         1.00         0.951         "         70.0-130         95.1           1.1-Dichloroethene         "         1.00         0.773         "         70.0-130         77.3           Toluene         "         1.00         0.884         "         70.0-130         88.4	-					"					
Surrogate:       2-Bromopropene       "       2.00       1.91       "       70.0-130       95.5         Surrogate:       1.2-DCA-d4       "       2.00       1.99       "       70.0-130       99.5         Surrogate:       4-BFB       "       2.00       1.99       "       70.0-130       99.5         Surrogate:       4-BFB       "       2.00       1.92       "       70.0-130       96.0         LCS       0880906-BS1       Benzene       8/31/98       1.00       0.933       mg/kg dry       70.0-130       93.3         Chlorobenzene       "       1.00       0.951       "       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4		n				"					
Surrogate:       1.2-DCA-d4       "       2.00       1.99       "       70.0-130       99.5         Surrogate:       Toluene-d8       "       2.00       1.99       "       70.0-130       99.5         Surrogate:       4-BFB       "       2.00       1.92       "       70.0-130       96.0         LCS       0880906-BS1       Benzene       8/31/98       1.00       0.933       mg/kg dry       70.0-130       93.3         Chlorobenzene       "       1.00       0.951       "       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4		"	2.00			<del></del>		95.5			
Surrogate:       Toluene-d8       "       2.00       1.99       "       70.0-130       99.5         Surrogate:       4-BFB       "       2.00       1.92       "       70.0-130       96.0         LCS       0880906-BS1       Benzene       8/31/98       1.00       0.933       mg/kg dry       70.0-130       93.3         Chlorobenzene       "       1.00       0.951       "       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4		"				"					
Surrogate: 4-BFB     "     2.00     1.92     "     70.0-130     96.0       LCS     0880906-BS1       Benzene     8/31/98     1.00     0.933     mg/kg dry     70.0-130     93.3       Chlorobenzene     "     1.00     0.951     "     70.0-130     95.1       1.1-Dichloroethene     "     1.00     0.773     "     70.0-130     77.3       Toluene     "     1.00     0.884     "     70.0-130     88.4		"				"					
Benzene     8/31/98     1.00     0.933     mg/kg dry     70.0-130     93.3       Chlorobenzene     " 1.00     0.951     " 70.0-130     95.1       1.1-Dichloroethene     " 1.00     0.773     " 70.0-130     77.3       Toluene     " 1.00     0.884     " 70.0-130     88.4		"				"					
Benzene       8/31/98       1.00       0.933       mg/kg dry       70.0-130       93.3         Chlorobenzene       "       1.00       0.951       "       70.0-130       95.1         1.1-Dichloroethene       "       1.00       0.773       "       70.0-130       77.3         Toluene       "       1.00       0.884       "       70.0-130       88.4	LCS	USSUOUS BS	21								
Chlorobenzene     "     1.00     0.951     "     70.0-130     95.1       1.1-Dichloroethene     "     1.00     0.773     "     70.0-130     77.3       Toluene     "     1.00     0.884     "     70.0-130     88.4					0.033	ma/ka day	70.0-130	03.3			
1.1-Dichloroethene     "     1.00     0.773     "     70.0-130     77.3       Toluene     "     1.00     0.884     "     70.0-130     88.4											
Toluene " 1.00 0.884 " 70.0-130 88.4		**									
700 177		**									
1.00 0.935 /0.0-130 93.3		••									
	rremordement		1.00		0.933		/0.0-130	93.3		1	

North Creek Analytical - Bothell



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Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Received:

8/21/98

Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

# Volatile Organic Compounds by EPA Method 8260B/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	Re	porting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
LCS (continued)	0880906-BS1									
Surrogate: 2-Bromopropene	8/31/98	2.00		1.90	mg/kg dry	70.0-130	95.0	-		
Surrogate: 1,2-DCA-d4	,,	2.00		2.15	,,	70.0-130	108			
Surrogate: Toluene-d8	"	2.00		2.00	"	70.0-130	100			
Surrogate: 4-BFB	"	2.00		1.99	"	70.0-130	99.5°			
Matrix Spike	0880906-MS	L	B808411-01							
Benzene	8/31/98	1.17	ND	0.994	mg/kg dry	70.0-130	85.0			
Chlorobenzene	••	1.17	ND	1.01	11	70.0-130	86.3			
1.1-Dichloroethene	n	1.17	ND	0.793	21	70.0-130	67.8			13
Toluene	"	1.17	ND	0.945	**	70.0-130	80.8			
Trichloroethene	"	1.17	ND	1.00	11	70.0-130	85.5			
Surrogate: 2-Bromopropene	,,	2.34		1.90	"	70.0-130	81.2		-	
Surrogate: 1,2-DCA-d4	"	2.34		2.19	"	70.0-130	93.6			
surrogate: Toluene-d8	"	2.34		2.06	"	70.0-130	88.0		•	
Surrogate: 4-BFB	"	2.34		2.09	"	70.0-130	89.3			
Matrix Spike Dup	0880906-MSI	<u>)1</u>	B808411-01						:	
Benzene	8/31/98	1.17	ND	1.03	mg/kg dry	70.0-130	88.0	15.0	3.47	
Chlorobenzene	**	1.17	ND	1.06	"	70.0-130	90.6	15.0	4.86	
1,1-Dichloroethene	**	1.17	ND	0.840	18	70.0-130	71.8	15.0	5.73	•
Toluene		1.17	. ND	0.983	**	70.0-130	84.0	15.0	3.88	
Trichloroethene .	**	1.17	ND	1.04	**	70.0-130	88.9	15.0	3.90	
Surrogate: 2-Bromopropene	"	2 34		2.03	,	70.0-130	86.8			
Surrogate: 1,2-DCA-d4	"	2.34		2.30	"	70.0-130	98.3			
Surrogate: Toluene-d8	"	2.34		2.19	"	70.0-130	93.6			
Surrogate 4-BFB	"	2.34		2.17	"	70.0-130	92.7			

Sorth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chapg. Project Manager



PORTLAND • (503) 906-9200 • FAX 906-921

Tetra Tech. Inc.

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800

Project Number: 10022-03

Received: 8/21/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	· · ·	Reporting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0880681	Date Prepa	red: 8/25/9	98		Extrac	tion Method: EP/	A 3550B		
Blank	0880681-BI		<u> </u>		<u> </u>	ttyn Magnout 217	110000		
Acenaphthene	8/26/98			ND	mg/kg	dry 0.100			
Acenaphthylene	"			ND	"	0.100			
Aniline	n			ND	"	0.100			
Anthracene	"			ND	11	0.100			
Benzoic Acid	"			ND	н	0.500			
Benzo (a) anthracene	**			ND	11	0.100			
Benzo (b) fluoranthene	,,			ND		0.100			
Benzo (k) fluoranthene				ND	11	0.100			
Benzo (ghi) perylene	н			ND	"	0.100			
Benzo (a) pyrene	"			ND	н	0.100			
Benzyl alcohol	"			ND	"	0.100			
Bis(2-chloroethoxy)methane	11			ND	. "	0.100			
Bis(2-chloroethyl)ether	11			ND	. "	0.100	•		(6
Bis(2-chloroisopropyl)ether	11			ND	•	0.100			
Bis(2-ethylhexyl)phthalate	II.			ND	н	0.500			
4-Bromophenyl phenyl ether	n e			ND	"	0.100			
Butyl benzyl phthalate	*1			ND	**	0.100			
Carbazole	H			ND	11	0.500			
4-Chloroaniline	ti			ND	II.	0.100			
2-Chloronaphthalene				ND	**	0.100			•
4-Chloro-3-methylphenol	11			ND	•	0.100			
2-Chlorophenol	**			ND	II .	0.100			
4-Chlorophenyl phenyl ether	10			ND	11	0.100			
Chrysene	le .			ND	H	0.100			
Dibenz (a,h) anthracene	11			ND	**	0.100			
Dibenzofuran	n			ND	n	0.100			
Di-n-butyl phthalate	n			ND	н	0.500			
1.3-Dichlorobenzene	n			ND	*1	0.100			
1.4-Dichlorobenzene	n .			ND	"	0.100			
1.2-Dichlorobenzene				ND	н	0.100			
3.3'-Dichlorobenzidine	**			ND	**	5.00			
2.4-Dichlorophenol				ND	n	0.100			
Diethyl phthalate				ND	.,	0.100			
2.4-Dimethylphenol				ND	**	0.100			
Dimethyl phthalate		•		ND	н	0.100			
4.6-Dinitro-2-methylphenol	"			ND	n	0.500			
2.4-Dinitrophenol	••			ND	"	0.500			-
·						200			

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definite

Joy B Chang, Project Manager

18939 120th Avenue N E., Suite 101, Bothell, WA 98011-9508
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03

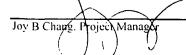
Project Manager: Carlotta Cellucci

Received: 8/21/98 9/25/98 13:58 Reported:

Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

2-Methylphenol		Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
2.4-Dinitrotoluene	Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u> _	Limit	%	Notes*
2.4-Dinitrotoluene	Rlank (continued)	14-1230220	K1								
2.6-Dinitrotoluene			4171		ND	mo/ko /	dry 0.100				
Di-n-octyl phthalate	•						•				
Fluoranthene   ND		**									
Fluorene		•									
Hexachlorobenzene		"				**					
Hexachlorobutadiene		11				"					
Hexachlorocyclopentadiene		"				11					
Hexachlorothane											
Indeno (1.2.3-cd) pyrene	• •	11				**					
Sophorone   "		n				) r					
Methylphenol   ND	Isophorone	P			ND	**					
Methylphenol   ND	•	н			ND						
& 4-Methylphenol       "       0.100         Naphthalene       "       0.100         2-Nitroaniline       "       0.500         3-Nitroaniline       "       0.500         4-Nitroaniline       "       0.500         Nitrobenzene       "       ND "       0.500         2-Nitrophenol       "       ND "       0.100         4-Nitrosodiphenylamine       "       0.500       0.500         N-Nitrosodiphenylamine       "       0.100       0.200         N-Nitrosodiphenylamine       "       0.100       0.100         Pentachlorophenol       "       ND "       0.100         Phenanthrene       "       ND "       0.100         Phenol       "       ND "       0.100         Phenol       "       ND "       0.100         Pyrene       "       ND "       0.100         2.4.5-Trichlorophenol       "       ND "       0.500         2.4.5-Trichlorophenol       "       ND "       0.100         2.4.6-Triphlorophenol       "       1.67       1.18 "       19.0-141       70.7         Surrogate: 2-FP       "       1.67       1.18 "       44.0-128       70.7		n				**					
Naphthalene " ND " 0.100 2-Nitroaniline " ND " 0.500 3-Nitroaniline " ND " 0.500 4-Nitroaniline " ND " 0.500 4-Nitroaniline " ND " 0.500 4-Nitrophenol " ND " 0.100 4-Nitrophenol " ND " 0.100 4-Nitrosodiphenylamine " ND " 0.500 N-Nitrosodiphenylamine " ND " 0.500 N-Nitrosodiphenylamine " ND " 0.100 Pentachlorophenol " ND " 0.100 Pentachloro		n				n					
3-Nitroaniline   "	Naphthalene	II.				11				-4	
3-Nitroaniline " ND " 0.500 4-Nitrobancine " ND " 0.500 Nitrobenzene " ND " 0.100 2-Nitrophenol " ND " 0.100 4-Nitrophenol " ND " 0.500 N-Nitrosodiphenylamine " ND " 0.200 N-Nitrosodiphenylamine " ND " 0.100 Pentachlorophenol " ND " 0.500 Phenanthrene " ND " 0.100 Phenol " ND " 0.100 Phenol " ND " 0.100 Phenol " ND " 0.100 Pyrene " ND " 0.100 2.4.5-Trichlorobenzene " ND " 0.100 2.4.5-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol  2-Nitroaniline	11			ND	**	0.500					
ND	3-Nitroaniline	19			ND	*					
ND	4-Nitroaniline	**			ND	H	0.500				
ND	Nitrobenzene	"			ND	"	0.100				
N-Nitrosodiphenylamine " ND " 0.200 N-Nitrosodi-n-propylamine " ND " 0.100 Pentachlorophenol " ND " 0.500 Phenanthrene " ND " 0.100 Phenol " 0.100 Pyrene " ND " 0.100 Pyrene " ND " 0.100 Pyrene " ND " 0.100 2.4.5-Trichlorobenzene " ND " 0.100 2.4.5-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol " ND " 0.500 Surrogate 2-FP " 1.67 1.18 " 19.0-141 70.7 Surrogate Phenol-d6 " 1.67 1.18 " 44.0-128 70.7 Surrogate 2.4.6-TBP " 1.67 1.18 " 44.0-128 70.7 Surrogate: Nurobenzene-d5 " 1.67 1.64 " 10.0-137 98.2 Surrogate: Nurobenzene-d5 " 1.67 1.33 " 33.0-108 79.6 Surrogate: 2-FBP " 1.67 1.58 " 51.0-124 94.6	2-Nitrophenol	н			ND	**	0.100				
N-Nitrosodi-n-propylamine N-Nitrosodi-n-prop	4-Nitrophenol	n			ND	11	0.500				
Pentachlorophenol " ND " 0.500 Phenanthrene " ND " 0.100 Phenol " ND " 0.100 Pyrene " ND " 0.100 Pyrene " ND " 0.100 1.2.4-Trichlorobenzene " ND " 0.100 2.4.5-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol " ND " 0.100 Surrogate: 2-FP " 1.67 1.18 " 19.0-141 70.7 Surrogate: Phenol-d6 " 1.67 1.18 " 44.0-128 70.7 Surrogate: 2.4.6-TBP " 1.67 1.64 " 10.0-137 98.2 Surrogate: Nurobenzene-d5 " 1.67 1.33 " 33.0-108 79.6 Surrogate: 2-FBP " 1.67 1.58 " 51.0-124 94.6	N-Nitrosodiphenylamine	••			ND	U	0.200				
Phenanthrene " ND " 0.500 Phenol " ND " 0.100 Pyrene " ND " 0.100 1.2.4-Trichlorobenzene " ND " 0.100 2.4.5-Trichlorophenol " ND " 0.100 2.4.6-Trichlorophenol " ND " 0.500 2.4.6-Trichlorophenol " ND " 0.100 Surrogate: 2-FP " 1.67 1.18 " 19.0-141 70.7 Surrogate: Phenol-d6 " 1.67 1.18 " 44.0-128 70.7 Surrogate: 2.4.6-TBP " 1.67 1.64 " 10.0-137 98.2 Surrogate: Nitrobenzene-d5 " 1.67 1.33 " 33.0-108 79.6 Surrogate: 2-FBP " 1.67 1.58 " 51.0-124 94.6	N-Nitrosodi-n-propylamine	**			ND	н	0.100				
ND	Pentachlorophenol	**	•		ND	n	0.500				
Pyrene " ND " 0.100  1.2.4-Trichlorobenzene " ND " 0.100  2.4.5-Trichlorophenol " ND " 0.500  2.4.6-Trichlorophenol " ND " 0.100  Surrogate: 2-FP " 1.67 1.18 " 19.0-141 70.7  Surrogate: Phenol-d6 " 1.67 1.18 " 44.0-128 70.7  Surrogate: 2.4.6-TBP " 1.67 1.64 " 10.0-137 98.2  Surrogate: Nurobenzene-d5 " 1.67 1.33 " 33.0-108 79.6  Surrogate: 2-FBP " 1.67 1.58 " 51.0-124 94.6	Phenanthrene	11			ND	W.	0.100				
1.2.4-Trichlorobenzene	Phenol	н			ND	ш	0.100				
ND	Pyrene	11			ND	н	0.100				
ND         "         0.100           Surrogate: 2-FP         "         1.67         1.18         "         19.0-141         70.7           Surrogate: Phenol-d6         "         1.67         1.18         "         44.0-128         70.7           Surrogate: 2.4,6-TBP         "         1.67         1.64         "         10.0-137         98.2           Surrogate: Nurobenzene-d5         "         1.67         1.33         "         33.0-108         79.6           Surrogate: 2-FBP         "         1.67         1.58         "         51.0-124         94.6	1.2.4-Trichlorobenzene	"			ND		0.100				
Surrogate   2-FP	2.4.5-Trichlorophenol	19			ND	11	0.500				
Surrogate: Phenol-d6       "       1.67       1.18       "       44.0-128       70.7         Surrogate: 2,4,6-TBP       "       1.67       1.64       "       10.0-137       98.2         Surrogate: Nurobenzene-d5       "       1.67       1.33       "       33.0-108       79.6         Surrogate: 2-FBP       "       1.67       1.58       "       51.0-124       94.6	2.4.6-Trichlorophenol	11			ND	0	0.100				
Surrogate: 2.4.6-TBP       " 1.67       1.64 " 10.0-137 98.2         Surrogate: Nurobenzene-d5       " 1.67 1.33 " 33.0-108 79.6         Surrogate: 2-FBP       " 1.67 1.58 " 51.0-124 94.6	Surrogate: 2-FP	"	1.67	-	1.18	"	19.0-141	70.7		-	
Surrogate: Nurobenzene-d5     " 1.67     1.33     " 33.0-108     79.6       Surrogate: 2-FBP     " 1.67     1.58     " 51.0-124     94.6	Surrogate: Phenol-d6	"	1.67		1.18	"	44.0-128	7 <b>0</b> . 7			
Surrogate: 2-FBP " 1.67 1.58 " 51.0-124 94.6	Surrogate 2,4,6-TBP	,,	1.67		. 1.64	"	10.0-137	98.2			
	Surrogate: Nurobenzene-d5	"	1.67		1.33	"	33.0-108	79.6			
Surrogate. p-Terphenyl-d14 " 1.67 1.79 " 48.0-149 107	Surrogate: 2-FBP	"	1.67		1.58	"	51.0-124	94.6			
	Surrogate. p-Terphenyl-d14	"	1.67		1.79	"	48.0-149	107			

orth Creek Analytical - Bothell





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Tetra Tech, Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 8/17/98 to 8/20/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

Carlotta Cellucci

Received: 8/21/98 Reported: 9/25/98 13:58

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

•	Date	Spike	Sample	QC	Re	eporting Limit		RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes
LCS	0880681-BS	3 <u>1</u>							
Acenaphthene	8/26/98	3.33		2.22	mg/kg dry	48.0-110	66.7		
4-Chloro-3-methylphenol	"	6.67		5.00	"	34.0-115	75.0		
2-Chlorophenol	**	6.67		4.24	Ħ	57.0-110	63.6		
1,4-Dichlorobenzene	"	3.33 •		2.30	"	39.0-110	69.1		
2.4-Dinitrotoluene	н	3.33		2.51	**	50.0-110	75.4		
4-Nitrophenol	"	6.67		4.37	11	26.0-116	65.5		
N-Nitrosodi-n-propylamine	**	3.33		2.22	n .	28.0-147	66.7		
Pentachlorophenol	••	6.67		6.34	"	46.0-120	95.1		
Phenol	11	6.67		4.03	"	35.0-110	60.4		
Pyrene		3.33		2.89	**	35.0-143	86.8		
1,2,4-Trichlorobenzene	"	3.33		2.92	•	39.0-110	87.7		
Surrogate: 2-FP	,	1.67		1.21		19.0-141			
Surrogate: Phenol-d6	"	1.67		1.18	n	44.0-128	70.7		
Surrogate: 2.4,6-TBP	"	1.67		2.01	"	10.0-137	120		( ,
Surrogate: Nitrobenzene-d5	"	1.67		1.35	"	33.0-108	80.8		
Surrogate: 2-FBP	"	1.67		1.41	"	51.0-124	84.4		
Surrogate: p-Terphenyl-d!4	"	1.67		1.69	"	48.0-149	101		
Matrix Spike	0880681-MS	<u>51 B8</u>	308411-0 <u>5</u>						
Acenaphthene	8/26/98	3.97 .	. ND	2.93	mg/kg dry	34.0-122	73.8		
4-Chloro-3-methylphenol	•	7.93	ND	6.29	"	26.0-129	79.3		
2-Chlorophenol		7.93	ND	5.30	11	43.0-131	66.8		
1.4-Dichlorobenzene	**	3.97	ND	2.98	**	34.0-131	75.1		
2.4-Dinitrotoluene	11	3.97	ND	3.12	н	10.0-126	78.6		
4-Nitrophenol	"	7.93	ND	5.63	H	10.0-111	71.0		
N-Nitrosodi-n-propylamine	n	3.97	ND	2.81	0	29.0-160	70.8		
Pentachlorophenol	н	7.93	, ND	7.39	11	46.0-120	93.2		
Phenol	н	7.93	ND	5.06	"	41.0-118	63.8		
Pyrene	н	3.97	ND	3.85	U	44.0-122	97.0		
1.2.4-Trichlorobenzene	••	3.97	ND	3.63	11	10.0-176	91.4		
Surrogate: 2-FP	"	1.98		1.50		19.0-141	75.8		
Surrogate: Phenol-d6	"	1 98		1.48	"	44.0-128	74.7		
Surrogate: 2,4,6-TBP	"	1.98		2.43	"	10.0-137	123		
Surrogate: Nitrobenzene-d5	"	1.98		1.68	n .	33.0-108	84.8		
Surrogate: 2-FBP	"	1.98		1.90	"	51.0-124	96.0		
Surrogate: p-Terphenvl-d14	"	1.98		2.30	,,	48.0-149	116		

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

18939 120th Avenue N.E., Suite 101. Bothell, WA 98011-9508 East 11115 Montgomery. Suite B. Spokane, WA 99206-4776 9405 S.W Nimbus Avenue, Beaverton, OR 97008-7132



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Tetra Tech, Inc.

Project: Bradford Island Landfill

8/17/98 to 8/20/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

8/21/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/25/98 13:58 Reported:

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC	Re	porting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Matrix Spike Dup	<u>0880681-M</u>	<u>SD1</u> ]	<u> 8808411-05</u>							
Acenaphthene	8/26/98	3.97	ND	2.79	mg/kg dry	34.0-122	70.3	56.0	4.86	
4-Chloro-3-methylphenol	U	7.93	ND	5.95		26.0-129	75.0	29.0	5.57	
2-Chlorophenol	17	7.93	ND	5.18	· ·	43.0-131	65.3	27.0	2.27	
1.4-Dichlorobenzene	H	3.97	ND	2.99		34.0-131	75.3	23.0	0.266	
2.4-Dinitrotoluene	"	3.97	ND	2.96	"	10.0-126	74.6	22.0	5.22	
4-Nitrophenol	"	7.93	ND	5.05	н	10.0-111	63.7	43.0	10.8	
N-Nitrosodi-n-propylamine	n	3.97	ND	2.80	H	29.0-160	70.5	25.0	0.425	
Pentachlorophenol	H	7.93	ND	7.40	н	46.0-120	93.3	29.0	0.107	
Phenol	**	7.93	ND	4.91	••	41.0-118	61.9	29.0	3.02	
Pyrene	n	3.97	ND	3.45	**	44.0-122	86.9	31.0	11.0	
1.2.4-Trichlorobenzene	14	3.97	ND	3.46	"	10.0-176	87.2	24.0	4.70	
Surrogate: 2-FP	. "	Ĭ.98		1.49	"	19.0-141	75.3	········· •		
Surrogate: Phenol-d6	"	1.98		1.47	"	44.0-128	74.2			
Surrogate: 2,4,6-TBP	"	1.98		2.28	••	10.0-137	115			
Surrogate: Nitrobenzene-d5	"	1.98		1.56	"	33.0-108	78.8			
Surrogate: 2-FBP	"	1.98		1.83	"	51.0-124	92.4			
Surrogate: p-Terphenyl-d14	"	1.98		2.03	"	48.0-149	103			

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Tetra Tech, Inc. 600 University St., Suite 800

Seattle, WA 98101

Project: Bradford Island Landfill

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Sampled: 8/17/98 to 8/20/98

Received: 8/21/98

Reported: 9/25/98 13:58

#### **Notes and Definitions**

#	Note
1	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
2	To reduce matrix interference, the sample extract has undergone florisil clean-up, method 3620, which is specific to non-polar compound contamination.
3	The reporting limit for this analyte has been raised to account for matrix interference.
4	The surrogate recovery for this sample is outside of established control limits. Review of associated QC indicates the recovery for this surrogate does not represent an out-of-control condition.
5	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
6	The reporting limit for this analyte has been raised due to interfering extraction background peaks.
7	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
8	Due to matrix interference with the internal standard associated with this analyte, the reported result should be considered an approximate value.
9	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
10 -	Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.
11	The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
12	Visual examination indicates the RPD and/or matrix spike recovery is outside the control limit due to a non-homogeneous sample matrix.
13	The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
14	Analyses are not controlled on matrix spike RPD and/or percent recoveries when the sample concentration is significantly higher than the spike level.
15	Post-digestion Matrix Spike.

North Creek Analytical - Bothell

Joy B Chang, Project Manager

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Tetra Tech, Inc. Bradford Island Landfill Project: 600 University St., Suite 800 Project Number: 10022-03

Sampled: 8/17/98 to 8/20/98 Received: 8/21/98

Seattle, WA 98101 Project Manager: Carlotta Cellucci Reported: 9/25/98 13:58

#### **Notes and Definitions**

#	Note	
16	The spike recovery for this QC sample was outside the laboratory's default control limits but within the vendor's published acceptance criteria.	
DET	Analyte DETECTED	
ND	Analyte NOT DETECTED at or above the reporting limit	
NR	Not Reported	*
dry	Sample results reported on a dry weight basis	
Recov.	Recovery	
RPD	Relative Percent Difference	۵

orth Creek Analytical - Bothell

Joy B Chang. Project Manager

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TETRA TECH, INC. 600 ML/VELS 11/97:
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Distribution: Original - Lab Copy Yellow copy - Final Tetra Tech Copy Pink Copy - Field File Copy



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Tetra Tech. Inc.

Project: Project Number: 10022-03

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98 9/3/98 Received:

600 University St., Suite 800 Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### **ANALYTICAL REPORT FOR SAMPLES:**

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
090198-BIL-MW3-GW-01	B809089-01	Water	9/1/98
090198-BIL-MW4-GW-01	B809089-02	Water	9/1/98
090298-BIL-MW2-GW-01	B809089-03	Water	9/2/98
090198-BIL-MW5-GW-01	B809089-04	Water	9/1/98
TRIP BLANK	B809089-05	Water	9/1/98

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Joy B Chang. Project Manage



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Tetra Tech, Inc.

Project: Bradford Island Landfill Project Number: 10022-03

Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Seattle, WA 98101

600 University St., Suite 800

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

## Hydrocarbon Identification by Washington DOE Method NWTPH-HCID North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B8090	RQ_01			<u>Water</u>	
Gx Range Hydrocarbons	0980181	9/5/98	9/8/98	<u> </u>	0.250	ND	mg/l	
Kerosene Range Hydrocarbons	"	"	"		0.630	ND	"	
Diesel Range Hydrocarbons		••			0.630	ND		
Insulating Oil Range Hydrocarbons	••	,,			0.630	ND	•	
Heavy Fuel Oil Range Hydrocarbons	n	o	11		0.630	ND	,,	
Lube Oil Range Hydrocarbons	**	"	**		0.630	ND	u	
Surrogate: 2-FBP	"	<del></del> <del></del> <del></del>	<del></del>	50.0-150		72.5	%	
090198-BIL-MW4-GW-01			B80908	89- <u>02</u>			Water	
Gx Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	ND	mg/l	
Kerosene Range Hydrocarbons	D	,,	н		0.630	ND	" .	
Diesel Range Hydrocarbons	11	**	15		0.630	ND	"	
Insulating Oil Range Hydrocarbons	"	n	**		0.630	ND	"	
Heavy Fuel Oil Range Hydrocarbons	**	H			0.630	ND	**	
Lube Oil Range Hydrocarbons	**	**	н		0.630	ND	41	
Surrogate: 2-FBP	,,		"	50.0-150		85.0	%	
090298-BIL-MW2-GW-01			B8090	89- <u>03</u>			<u>Water</u>	
Gx Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	ND	mg/l	
Kerosene Range Hydrocarbons	11	o	**		0.630	ND	н	
Diesel Range Hydrocarbons			11		0.630	ND	··	
Insulating Oil Range Hydrocarbons	II .	н	11		0.630	ND	**	
Heavy Fuel Oil Range Hydrocarbons	11	"	**		0.630	ND	н	
Lube Oil Range Hydrocarbons	"	**	**		0.630	ND		
Surrogate. 2-FBP	. "	" "	"	50.0-150		81.3	%	
090198-BIL-MW5-GW-01			B8090	<u>89-04</u>			<u>Water</u>	
Gx Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	ND	mg/l	
Kerosene Range Hydrocarbons	"	u .	11		0.630	ND	**	
Diesel Range Hydrocarbons	II .	11	"	•	0.630	ND	11	
Insulating Oil Range Hydrocarbons		"	•		0.630	ND	0	
Heavy Fuel Oil Range Hydrocarbons	"	"	**		0.630	ND	**	
Lube Oil Range Hydrocarbons	"	n	n		0.630	ND	"	
Surrogate: 2-FBP	" .	"	"	50.0-150		82.9	%	

North Creek Analytical - Bothell



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Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

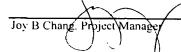
Carlotta Cellucci

Reported: 9/28/98 17:46

#### Volatile Petroleum Products by NWTPH-Gx North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B8090	89-01			<u>Water</u>	
Gasoline Range Hydrocarbons	0980148	9/4/98	9/4/98		50.0	ND	ug/l	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		119	%	
090198-BIL-MW4-GW-01			B80908	<u>89-02</u>			<u>Water</u>	
Gasoline Range Hydrocarbons	0980148	9/4/98	9/4/98		50.0	ND	ug/l	
Surrogate: 4-BFB (FID)	"	,,	"	50.0-150		129	%	
090298-BIL-MW2-GW-01			B8090	89-0 <u>3</u>			<u>Water</u>	
Gasoline Range Hydrocarbons	0980148	9/4/98	9/4/98		50.0	ND	ug/l	
Surrogate: 4-BFB (FID)	"		"	50.0-150		124	%	
090198-BIL-MW5-GW-01			B8090	89-04			Water	
Gasoline Range Hydrocarbons	0980148	9/4/98	9/4/98		50.0	ND	ug/l	
Surrogate: 4-BFB (FID)	,, ·-·	. ,,	"	50.0-150		125	<del>%</del>	(

North Creek Analytical - Bothell





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Tetra Tech, Inc.
Project: Bradford Island Landfill
600 University St., Suite 800
Project Number: 10022-03
Seattle, WA 98101
Project Manager: Carlotta Cellucci

Received: 9/3/98

9/1/98 to 9/2/98

Project Manager: Carlotta Cellucci Reported: 9/28/98 17:46

# Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte .	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B8090	89 <u>-01</u>			<u>Water</u>	
Diesel Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	ND	mg/l	
Lube Oil Range Hydrocarbons	**		n		0.500	ND	"	
Surrogate: 2-FBP	"		"	50.0-150		72.5	%	
090198-BIL-MW4-GW-01	•		B8090	89-0 <u>2</u>			<u>Water</u>	
Diesel Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	0.332	mg/l	
Lube Oil Range Hydrocarbons	n	••			0.500	ND	"	
Surrogate: 2-FBP	,,		,,	50.0-150		85.0	%	
090298-BIL-MW2-GW-01			B80908	<u>89-03</u>			<u>Water</u>	
Diesel Range Hydrocarbons	0980181	9/5/98	9/8/98		0.250	0.502	mg/l	
Lube Oil Range Hydrocarbons	**	n	D		0.500	ND	"	
Surrogate: 2-FBP	"	,	"	50.0-150		81.3	%	
090198-BIL-MW5-GW-01			B80908	89-04			<u>Water</u>	
Diesel Range Hydrocarbons	0980181	9/5/98	9/8/98	<del></del>	0.250	0.340	mg/l	
Lube Oil Range Hydrocarbons	11	"	11		0.500	ND	"	
Surrogate: 2-FBP	"	,,	"	50.0-150		82.9	%	

orth Creek Analytical - Bothell





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SPOKANE = (509) 924-9200 = FAX 924-9290

PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill 10022-03

Sampled: 9/1/98 to 9/2/98 Received: 9/3/98

Seattle, WA 98101

Project Number:

Project Manager: Carlotta Cellucci

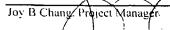
Reported: 9/28/98 17:46

### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B80908	89-01			<u>Water</u>	
Calcium	0980557	9/17/98	9/22/98	EPA 6010B	0.250	20.7	mg/l	
Iron	"	н	"	EPA 6010B	0.150	ND	"	
Magnesium	•	н	**	EPA 6010B	0.100	6.49	н	
Potassium		н	n	EPA 6010B	0.200	1.54	**	
Sodium	"	**	**	EPA 6010B	0.500	5.89	н	
Antimony	0980333	9/10/98	9/11/98	EPA 6020	0.00100	ND	n	
Arsenic	•	11	re	EPA 6020	0.00100	ND	"	
Barium	**	n		EPA 6020	0.0100	0.0233	**	
Beryllium	п	11		EPA 6020	0.00100	ND		
Cadmium	"	"	"	EPA 6020	0.00100	ND	n	
Chromium	11	•	**	EPA 6020	0.00100	0.00111	H	
Cobalt	14	11	It	EPA 6020	0.00100	ND	n	
Copper	u	**	P	EPA 6020	0.00100	0.00185	**	
Lead	••		H	EPA 6020	0.00100	ND	**	(
Manganese	•	"	**	EPA 6020	0.00100	0.348	,,	
Nickel	**	.,	**	EPA 6020	0.00100	0.00247	n	
Selenium	**	11	**	EPA 6020	0.00100	ND	11	
Silver	11	**	10	EPA 6020	0.00100	ND	•	
Thallium			н	EPA 6020	0.00100	ND	**	
Vanadium	11	**	**	EPA 6020	0.00100	ND	n,	
Zinc	ti	11	**	EPA 6020	0.0100	ND	"	
Mercury ·	0980414	9/14/98	9/15/98	EPA 7470A	0.00100	ND	**	
Aluminum	0980533	9/23/98	9/23/98	EPA 6020	0.0500	0.107	**	
090198-BIL-MW4-GW-01			B80908	RO_02			<u>Water</u>	
Calcium	0980557	9/17/98	9/22/98	EPA 6010B	0.250	72.6	mg/l	
Iron	"	,, ,	"	EPA 6010B	0.150	11.0	"	
Magnesium		••	••	EPA 6010B	0.100	16.4	11	
Potassium	"		н	EPA 6010B	0.200	4.70	n	
Sodium	н	**		EPA 6010B	0.500	9.26	•1	
Antimony	0980333	9/10/98	9/11/98	EPA 6020	0.00100	ND	ie .	
Arsenic	"	"	9/11/70	EPA 6020	0.00100	0.00228		
Barium	n	,,	и	EPA 6020	0.00100	0.00228	11	
Beryllium	**			EPA 6020	0.00100	ND	n	
Cadmium	11	11		EPA 6020	0.00100	ND ND	•	
Chromium			"	EPA 6020	0.00100	0.00350	**	
Cobalt	**		н	EPA 6020 EPA 6020	0.00100	0.00553	**	
Copper		**				0.00553	11	
Coppei	•			EPA 6020	0.00100	0.00/01		

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin



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Page 5 of 51



PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

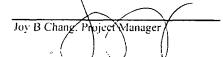
Seattle, WA 98101

Project Manager: Carlotta Cellucci Reported: 9/28/98 17:46

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Note
090198-BIL-MW4-GW-01 (continued)			<u>B80908</u>	89-02			<u>Water</u>	
Lead	0980333	9/10/98	9/11/98	EPA 6020	0.00100	0.0123	mg/l	
Manganese	n	10	9/12/98	EPA 6020	0.0100	2.49	"	
Nickel	11	**	9/11/98	EPA 6020	0.00100	0.00939	"	
Selenium	"	•	**	EPA 6020	0.00100	ND	11	
Silver	"	n	**	EPA 6020	0.00100	ND	11	
<b>Thallium</b>	**	n		EPA 6020	0.00100	ND	n	
Vanadium	•	11	н	EPA 6020	0.00100	0.00691	**	
Zinc	n .	**	11	EPA 6020	0.0100	0.0237	11	•
Mercury	0980414	9/14/98	9/15/98	EPA 7470A	0.00100	ND	**	
Aluminum	0980533	9/23/98	9/23/98	EPA 6020	0.250	1.46	"	
090298-BIL-MW2-GW-01			B80908	<u> 39-03</u>			Water	
Calcium	0980557	9/17/98	9/22/98	EPA 6010B	0.250	4.51	mg/l	
ron	**		"	EPA 6010B	0.150	4.34	"	
Magnesium	u	••	**	EPA 6010B	0.100	1.17	n	4.
Potassium	11	II .	11	EPA 6010B	0.200	5.15	•	-
Sodium			11	EPA 6010B	0.500	49.2	n	
Antimony	0980333	9/10/98	9/11/98	EPA 6020	0.00100	0.00108	н	
Arsenic	11	"	•	EPA 6020	0.00100	0.00808	n	•
Barium	**	н	"	EPA 6020	0.0100	0.128	н	
Beryllium	"	**	11	EPA 6020	0.00100	ND	II .	•
Cadmium	n .	**	**	EPA 6020	0.00100	ND	11	
Chromium	н	n	· ·	EPA 6020	0.00100	0.00351	11	•
Cobalt	n	11	n .	EPA 6020	0.00100	0.00163	n	
Copper	· ·	**	*	EPA 6020	00100.0	0.00567	"	
Lead	11	"	"	EPA 6020	0.00100	0.00771	11	
langanese	n	11	r	EPA 6020	0.00100	0.0987	**	
Sickel		11		EPA 6020	0.00100	0.00246	n	
Selenium	"	*11	11	EPA 6020	0.00100	0.00148	II .	
Silver	"	"	**	EPA 6020	0.00100	ND	n .	
hallium	n	11	••	EPA 6020	0.00100	ND	n	
/anadium	"	"		EPA 6020	0.00100	0.0119	n	
line	**	"	н	EPA 6020	0.0100	0.0268	п	
Mercury	0980414	9/14/98	9/15/98	EPA 7470A	0.00100	ND	11	
Muminum	0980533	9/23/98	9/23/98	EPA 6020	0.250	3.48	"	
90198-BIL-MW5-GW-01			B80908	<u>19-04</u>		•	<u>Water</u>	
Calcium	0980557	9/17/98	9/22/98	EPA 6010B	0.250	72.9	mg/l	

orth Creek Analytical - Bothell





PORTLAND - (503) 906-9200 - FAX 906-921

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number:

10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Ca

r: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Total Metals by EPA 6000/7000 Series Methods North Creek Analytical - Bothell

-	Batch	Date	Date	Specific	Reporting			
Analyte	Number	Prepared	Analyzed	Method	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01 (continued)			B80908	89-0 <u>4</u>			<u>Water</u>	
Iron	0980557	9/17/98	9/22/98	EPA 6010B	0.150	8.88	mg/l	
Magnesium	II.	**	"	EPA 6010B	0.100	16.7	"	
Potassium	11	н	н	EPA 6010B	0.200	4.91		
Sodium	ti	н	н	EPA 6010B	0.500	10.3	H	
Antimony	0980333	9/10/98	9/11/98	EPA 6020	0.00100	ND	n	
Arsenic	tr .	**	n	EPA 6020	0.00100	0.00261	**	
Barium	н		11	EPA 6020	0.0100	0.249	11	
Beryllium	H	11	11	EPA 6020	0.00100	ND	11	
Cadmium	н	**	**	EPA 6020	0.00100	ND	10	
Chromium	n	n	**	EPA 6020	0.00100	0.00345	"	
Cobalt	n	**	11	EPA 6020	0.00100	0.00562	11	
Copper		••	**	EPA 6020	0.00100	0.00730	17	
Lead	"	,	"	EPA 6020	0.00100	8010.0	"	
Manganese	**	**	9/12/98	EPA 6020	0.0100	2.68	11	(1
Nickel	п	**	9/11/98	EPA 6020	0.00100	0.00902	>>	
Selenium	ч	**	11	EPA 6020	0.00100	ND	10	
Silver	"	••	41	EPA 6020	0.00100	ND	**	
Thallium	"	"	"	EPA 6020	00100.0	ND	n	
Vanadium	w	**	n	EPA 6020	0.00100	0.00663	**	
Zinc		"	H	EPA 6020	0.0100	0.0238	**	
Mercury	0980414	9/14/98	9/15/98	EPA 7470A	0.00100	ND	**	
Aluminum	0980533	9/23/98	9/23/98	EPA 6020	0.250	1.63	,,	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and definition

Joy B Chang, Project Manager



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Tetra Tech. Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

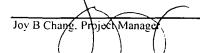
Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<del></del>	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
000100 BH 160V2 CW 04	-		D0000	20.01			Water	
090198-BIL-MW3-GW-01		- 1 <b>-</b> 100	B8090	<u>89-01</u>	0.0400		<u>Water</u>	
Aldrin	0980180	9/5/98	9/24/98		0.0400	ND	ug/l "	
alpha-BHC		п	**		0.0200	ND	"	
beta-BHC	n	n	II .		0.0300	ND		
delta-BHC	n	"	"		0.0200	ND	"	
gamma-BHC (Lindane)	"	"	••		0.0300	ND	•	
Chlordane (tech)	**		н		0.150	ND	n	
alpha-Chlordane	ti .	H	"		0.0200	ND	11	
gamma-Chlordane	19	"			0.0200	ND	11	
4,4'-DDD	•	**	· ·		0.0400	ND	. "	
4,4'-DDE	н	n	**		0.0300	ND	n	
4,4'-DDT	•	"	"		0.0900	ND	н .	
Dieldrin	11	••			0.0700	ND	11	
Endosulfan I	"	•			0.0300	ND	н	
Endosulfan II	•	•	**		0.0500	ND		
Endosulfan sulfate	н	**	**		0.0700	ND		
Endrin	n	••	u ·		0.0800	ND	u u	
Endrin aldehyde		11	**		0.0800	ND	n .	
Heptachlor	u				0.0300	ND	n	
Heptachlor epoxide	11		н		0.0300	ND	n	
Methoxychlor	11	**	н		0.500	ND	11	
Toxaphene	**				1.50	ND	11	
Aroclor 1016	11	,,	н	•	0.100	ND		
Aroclor 1221	n	••			0.100	ND	н	
Aroclor 1232	**	н	•		0.100	ND		
Aroclor 1242		••	н		0.100	ND	11	
Aroclor 1242 Aroclor 1248		н	**		0.100	ND	•	
	**	10	••		0.100	ND ND		
Aroclor 1254	n		11				11	
Aroclor 1260					0.100	ND		
Aroclor 1262	"	"	"		0.100	ND	"	
Aroclor 1268					0.100	ND		
Surrogate. TCX	"	"	"	40.0-130		81.5	%	

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW4-GW-01			B80908	89-02			<u>Water</u>	
Aldrin	0980180	9/5/98	9/24/98	<del></del>	0.0400	ND	ug/l	
alpha-BHC	u	"	**		0.0200	ND	`	
beta-BHC	n	••	•		0.0300	ND	**	
delta-BHC	n	**	••		0.0200	ND	n	
gamma-BHC (Lindane)	n	**	**		0.0300	ND	n	
Chlordane (tech)	n	•	н	·	0.150	ND	**	
alpha-Chlordane	"	**	н		0.0200	ND	**	
gamma-Chlordane	**	**	"		0.0200	ND	n	
4.4'-DDD	"	11			0.0400	ND	D	
4.4'-DDE	н		"		0.0300	ND	tr	
4,4'-DDT	"	"	•		0.0900	ND		
Dieldrin	н	R			0.0700	ND	n	
Endosulfan I	н	11	"		0.0300	ND	10	
Endosulfan II	· n	**	**		0.0500	ND	,,	( ·
Endosulfan sulfate	11	**	••		0.0700	ND	n	
Endrin	"	11	**		0.0800	ND	**	
Endrin aldehyde	н		**		0.0800	ND	**	
Heptachlor	,,		H		0.0300	ND	н	
Heptachlor epoxide	n	•	н		0.0300	ND	**	
Methoxychlor	**	1)	P)		0.500	ND	O.	
Toxaphene	"	"	,		1.50	ND	n	
Aroclor 1016	"	u	**		0.100	ND	11	
Aroclor 1221	n	••	**		0.100	ND	•	
Aroclor 1232		••	••		0.100	ND	11	
Aroclor 1242		**	**		0.100	ND	n	
Aroclor 1248	<b>"</b> .	11	"		0.100	ND	10	
Aroclor 1254	n		н		0.100	ND	**	
Aroclor 1260	"	*			0.100	ND	**	
Aroclor 1262	"	w	**		0.100	ND	**	
Aroclor 1268	n	n .			0.100	ND		
Surrogate: TCX	"	,,		40.0-130		77.5	%	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang, Project Manager



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Tetra Tech, Inc. 600 University St., Suite 800 Project: Brad

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Seattle, WA 98101

Project Number: 10022-03

Received: 9/3/98

Project Manager: Carlotta Cellucci

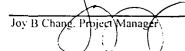
Reported: 9/28/98 17:46

# Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

B89089-03   Water   Aldrin   0980180   9/5/98   9/24/98   0.0400   ND   ug/l   alpha-BHC   " " " 0.0200   ND "   beta-BHC   " " " 0.0300   ND "   class   BHC   " " " 0.0300   ND "   class   BHC   " " 0.0300   ND "   class   BHC     " " 0.0300   ND "		Batch	Date	Date	Surrogate	Reporting			
Aldrin         0980180         9/5/98         9/24/98         0.0400         ND         ug/l           alpha BHC         "         "         "         0.0200         ND         "           beta-BHC         "         "         0.0300         ND         "           delta-BHC         "         "         0.0200         ND         "           gamma-BHC (Lindane)         "         "         0.0300         ND         "           chlordane (tech)         "         "         0.150         ND         "           alpha-Chlordane         "         "         0.0200         ND         "           apama-Chlordane         "         "         0.0200         ND         "           4.4-DDD         "         "         0.0200         ND         "           4.4-DDT         "         "         0.0300         ND         "           bicldrin         "         "         0.0900         ND         "           bidsulfan I         "         "         0.0900         ND         "           bidsulfan I         "         "         0.0500         ND         "           Endosulfan II	Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
Aldrin         0980180         9/5/98         9/24/98         0.0400         ND         ug/l           alpha BHC         "         "         "         0.0200         ND         "           beta-BHC         "         "         0.0300         ND         "           delta-BHC         "         "         0.0200         ND         "           gamma-BHC (Lindane)         "         "         0.0300         ND         "           chlordane (tech)         "         "         0.150         ND         "           alpha-Chlordane         "         "         0.0200         ND         "           apama-Chlordane         "         "         0.0200         ND         "           4.4-DDD         "         "         0.0200         ND         "           4.4-DDT         "         "         0.0300         ND         "           bicldrin         "         "         0.0900         ND         "           bidsulfan I         "         "         0.0900         ND         "           bidsulfan I         "         "         0.0500         ND         "           Endosulfan II	090298-BIL-MW2-GW-01			B8090	89-03			Water	
alpha-BHC         """"""""""""""""""""""""""""""""""""		0980180	9/5/98			0.0400	ND		
beta-BHC         """"""""""""""""""""""""""""""""""""		n		"					
gamma-BHC (Lindane)         """"""""""""""""""""""""""""""""""""	•	n	"	•		0.0300	ND	**	
Chlordane (tech)         """"""""""""""""""""""""""""""""""""	delta-BHC	"	n			0.0200	ND	n	
Chlordane (tech)         """"""""""""""""""""""""""""""""""""	gamma-BHC (Lindane)	"	**	••			ND	н	
gamma-Chlordane         " " " " " " " " " " " " " " " " " " "		**	n	**		0.150	ND	n .	
gamma-Chlordane         " " " " " " " " " " " " " " " " " " "	- · · · · · · · · · · · · · · · · · · ·	"	ti .	••			ND	11	
4.4'-DDD	•	н	"	· ·			ND	11	
4.4'-DDE	=	***	**	Ħ				**	
Dieldrin         " " " " " " " " " " " " " " " " " " "	4.4'-DDE	"	ti	**			ND	•	
Section   Sect	4.4'-DDT	**	H	**		0.0900	ND	11	
Indosulfan II         " " " " " 0.0500 ND "           Endosulfan sulfate         " " " 0.0700 ND "           Endrin         " " " 0.0800 ND "           Endrin aldehyde         " " 0.0800 ND "           Heptachlor         " " 0.0300 ND "           Heptachlor epoxide         " " 0.0300 ND "           Methoxychlor         " " 0.500 ND "           Toxaphene         " " 0.000 ND "           Aroclor 1016         " 0.100 ND "           Aroclor 1221         " 0.100 ND "           Aroclor 1232         " 0.100 ND "           Aroclor 1242         " 0.100 ND "           Aroclor 1248         " " 0.0100 ND "           Aroclor 1254         " 0.100 ND "           Aroclor 1260         " 0.00 ND "           Aroclor 1260         " 0.00 ND "           Aroclor 1260         " 0.00 ND "           Aroclor 1260         " 0.00 ND "	Dieldrin	н	**	•		0.0700	ND	**	
Endosulfan sulfate " " " " 0.0300 ND " Endrin	Endosulfan I	"	•			0.0300	ND	11	
Endrin       " " " " 0.0800 ND "         Endrin aldehyde       " " " 0.0800 ND "         Heptachlor       " " " 0.0300 ND "         Heptachlor epoxide       " " 0.0300 ND "         Methoxychlor       " " 0.500 ND "         Toxaphene       " " 0.500 ND "         Aroclor 1016       " " 0.0100 ND "         Aroclor 1221       " 0.100 ND "         Aroclor 1232       " 0.100 ND "         Aroclor 1242       " 0.100 ND "         Aroclor 1248       " 0.100 ND "         Aroclor 1254       " 0.100 ND "         Aroclor 1260       " 0.100 ND "         Aroclor 1262       " 0.100 ND "         Aroclor 1268       " 0.100 ND "	ndosulfan II	**	н	**		0.0500	ND	**	
Endrin aldehyde """"""""""""""""""""""""""""""""""""	Endosulfan sulfate	n		**		0.0700	ND	n	
Heptachlor " " " " 0.0300 ND " Heptachlor epoxide " " " " 0.0300 ND " Mcthoxychlor " " " 0.500 ND " Toxaphene " " " 1.50 ND " Toxaphene " " " NO.100 ND " ND " ND ND ND ND ND ND ND ND ND ND ND ND ND	Endrin		**	17		0.0800	ND	н	
Heptachlor epoxide " " " " 0.0300 ND " ND " Nothboxychlor " " " 0.500 ND " ND " NOT NATURE NOT NOT NOT NOT NOT NOT NOT NOT NOT NOT	Endrin aldehyde	**	n	н		0.0800	ND	n	
Heptachlor epoxide " " " " 0.0300 ND " Mcthoxychlor " " " 0.500 ND " Toxaphene " 1.50 ND " 1.50	•	11	"	**		0.0300	ND	**	
Methoxychlor       " " " " " " 1.50 ND "         Toxaphene       " " " " 1.50 ND "         Aroclor 1016       " " " " 1.50 ND "         Aroclor 1221       " " " 1.00 ND "         Aroclor 1232       " " " " 1.00 ND "         Aroclor 1242       " " " " 1.00 ND "         Aroclor 1248       " " " " 1.00 ND "         Aroclor 1254       " " " " 1.00 ND "         Aroclor 1260       " " " " 1.00 ND "         Aroclor 1262       " " " " 1.00 ND "         Aroclor 1268       " " " 1.00 ND "		n	"	**		0.0300	ND	10	
Toxaphene " " " " " 1.50 ND " Aroclor 1016 " " " " 0.100 ND " Aroclor 1221 " " " 0.100 ND " Aroclor 1232 " " " " 0.100 ND " Aroclor 1242 " " " 0.100 ND " Aroclor 1248 " " " 0.100 ND " Aroclor 1254 " " " 0.100 ND " Aroclor 1260 " " " " 0.100 ND " Aroclor 1262 " " " 0.100 ND " Aroclor 1262 " " " 0.100 ND " Aroclor 1268 " " " " 0.100 ND " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " 0.100 ND " Toxolor 1268 " " " " " 0.100 ND " " Toxolor 1268 " " " " " 0.100 ND " " Toxolor 1268 " " " " " 0.100 ND " " Toxolor 1268 " " " " " " 0.100 ND " " Toxolor 1268 " " " " " " 0.100 ND " " Toxolor 1268 " " " " " " 0.100 ND " " Toxolor 1268 " " " " " " " " 0.100 ND " " Toxolor 1268 " " " " " " " " " " " " " " " " " " "		**	•	11		0.500	ND	11	
Aroclor 1221 " " " 0.100 ND " Aroclor 1232 " " " 0.100 ND " Aroclor 1242 " " 0.100 ND " Aroclor 1248 " " " 0.100 ND " Aroclor 1254 " " 0.100 ND " Aroclor 1260 " " " 0.100 ND " Aroclor 1262 " " 0.100 ND " Aroclor 1268 " " 0.100 ND "  Aroclor 1268 " " 0.100 ND "	Toxaphene		n	11		1.50	ND	**	
Aroclor 1232 " " " " 0.100 ND " Aroclor 1242 " " " 0.100 ND " Aroclor 1248 " " " 0.100 ND " Aroclor 1254 " " " 0.100 ND " Aroclor 1260 " " " 0.100 ND " Aroclor 1262 " " " 0.100 ND " Aroclor 1268 " " 0.100 ND "  Onlow ND "  Onlow ND "  Onlow ND "  Onlow ND "  Onlow ND "  Onlow ND "	Aroclor 1016	•	**	**		0.100	ND	0	
Aroclor 1242 " " " 0.100 ND " Aroclor 1248 " " 0.100 ND " Aroclor 1254 " " 0.100 ND " Aroclor 1260 " " " 0.100 ND " Aroclor 1262 " " 0.100 ND " Aroclor 1268 " " 0.100 ND "	Aroclor 1221	D.	••	**		0.100	ND	**	
Aroclor 1248 " " " 0.100 ND " Aroclor 1254 " " 0.100 ND " Aroclor 1260 " " " 0.100 ND " Aroclor 1262 " " " 0.100 ND " Aroclor 1268 " " 0.100 ND "	Aroclor 1232	n .		**		0.100	ND	n	
Aroclor 1254       " " " " 0.100 ND "         Aroclor 1260       " " " 0.100 ND "         Aroclor 1262       " " " 0.100 ND "         Aroclor 1268       " " 0.100 ND "	Aroclor 1242	•	11	"			ND	tt	
Aroclor 1254       " " " " 0.100 ND "         Aroclor 1260       " " " 0.100 ND "         Aroclor 1262       " " " 0.100 ND "         Aroclor 1268       " " 0.100 ND "	Aroclor 1248	**	"	н		0.100	ND	н	
Aroclor 1260       " " " 0.100 ND "         Aroclor 1262       " " " 0.100 ND "         Aroclor 1268       " " 0.100 ND "	Aroclor 1254	н	11	"			ND	н	
Aroclor 1262 " " " 0.100 ND " Aroclor 1268 " " 0.100 ND "	Aroclor 1260	n	н	н				"	
Aroclor 1268 " " " " 0.100 ND "	Aroclor 1262	•	11					**	
	Aroclor 1268	u	"	"				**	
	Surrogate: TCX	"	"	"	40 0-130			%	

9405 S.W. Nimbus Avenue Beaverton, OR 97008-7132

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 1

10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

# Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082 North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte .	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01			B8090	89-04			<u>Water</u>	
Aldrin	0980180	9/5/98	9/24/98		0.0400	ND	ug/l	
alpha-BHC	n	**	н		0.0200	ND	**	
beta-BHC	н	**	**		0.0300	ND	11	
delta-BHC	н	••	11		0.0200	ND	**	
gamma-BHC (Lindane)	н	••	•		0.0300	ND	11	
Chlordane (tech)	H	11	*1		0.150	ND	11	
alpha-Chlordane	rı .	n	11		0.0200	ND	H	
gamma-Chlordane	**	**	11		0.0200	ND	**	
4.4′-DDD	11	**	•		0.0400	ND	It	
4.4'-DDE	11	•	n		0.0300	ND	11	
4.4´-DDT	n .	11	"		0.0900	ND	Ħ	
Dieldrin	11	11	•		0.0700	ND	**	
Endosulfan I	n	**	**		0.0300	ND	11	
Endosulfan II	n	**			0.0500	ND	**	(
Endosulfan sulfate	n	**	н		0.0700	ND	**	
Endrin	••	н	n		0.0800	ND	н	
Endrin aldehyde	"	"	"		0.0800	ND	Ħ	
Heptachlor	11	••	"		0.0300	ND	**	
Heptachlor epoxide	11	**	"		0.0300	ND	н	
Methoxychlor	lt.	н	n		0.500	ND	n .	
Toxaphene	"	**	"		1.50	ND	**	
Aroclor 1016	"		••		0.100	ND	**	
Aroclor 1221	•	••			0.100	ND	n	
Aroclor 1232		11	"		0.100	ND	11	
Aroclor 1242	**	n	"		0.100	ND	u .	
Aroclor 1248	"	*	11		0.100	ND		
Aroclor 1254	n .	••	,,		0.100	ND	••	
Aroclor 1260	"	"	n		0.100	ND	••	
Aroclor 1262	**	n	"		0.100	ND		
Aroctor 1268		"	n		0.100	ND	•	
Surrogate: TCX	"	,,	"	40.0-130		75.0	<del></del>	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang, Project Managor

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98 Received: 9/3/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

# Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B8090	<u>89-01</u>			<u>Water</u>	
2.4-D	0980213	9/8/98	9/22/98		0.500	ND	ug/l	
2,4-DB	**	н	n		1.00	ND	14	
2.4.5-T	If	11	н		1.00	ND	n	
2.4.5-TP (Silvex)	**	11	**		1.00	ND	11	
Dalapon	**	**	**		1.50	ND	**	
Dicamba	tr.	н	**		0.500	ND	**	
Dichlorprop	10	"	н		1.00	ND	**	
Dinoseb	11	**	n		1.00	ND	**	
MCPA	0	"	**		50.0	ND		
MCPP	"	11	**		50.0	ND	H .	
Surrogate: 2,4-DCAA	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		"	24.0-135		54.2	%	

090198-BIL-MW4-GW-01			B809089-	<u>-02</u>			<u>Water</u>
1.4-D	0980213	9/8/98	9/22/98		0.500	ND	ug/l
2.4-DB	. "	11	**		1.00	ND	**
2.4.5-T	**		"		1.00	ND	n
2.4.5-TP (Silvex)	11	н	**		1.00	ND	tt
Dalapon	**	11	**		1.50	ND	H
Dicamba	••	"	"		0.500	ND	n
Dichlorprop	U	u .	11		1.00	ND	**
Dinoseb	IF	11	н		1.00	ND	n ·
MCPA	11	"	п		50.0	ND	**
MCPP .	•	11	"		50.0	ND	11
Surrogate 2,4-DCAA	,	· <del></del>	,	24.0-135		82.5	%

090298-BIL-MW2-GW-01			B809089	-03		<u>Water</u>
2.4-D	0980213	9/8/98	9/22/98	0.500	ND	ug/l
2.4-DB	11	II .	•	1.00	ND	"
2.4.5-T	"	**	••	1.00	ND	ti .
2.4.5-TP (Silvex)	n	**		1.00	ND	"
Dalapon	н	н	**	1.50	ND	u
Dicamba	"	n	U	0.500	ND	"
Dichlorprop	"	II	н	1.00	ND	"
Dinoseh	. ,		**	1.00	ND	11
MCPA	**	**	u	50.0	ND	"
MCPP		IF	u	50.0	ND	· ·
Surrogate. 2.4-DCAA	"	"	"	24.0-135	66.3	%

North Creek Analytical - Bothell





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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci

9/3/98 Received: 9/28/98 17:46 Reported:

#### Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		-	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01			B80908	89-0 <u>4</u>			<u>Water</u>	
2.4-D	0980213	9/8/98	9/22/98		0.500	ND	ug/l	
2.4-DB	н	**	**		1.00	ND		
2.4.5-T	H	**	er .		1.00	ND	н .	
2.4.5-TP (Silvex)	"	tr	"		1.00	ND	rr	
Dalapon	11		•		1.50	ND	ie .	
Dicamba	R	**	11		0.500	ND	<b>85</b>	
Dichlorprop			11		1.00	ND	п	
Dinoseb	**	11	**		1.00	ND	P	
MCPA		•	*		50.0	ND	n	
MCPP	"	tr.	**		50.0	ND	•	
Surrogate: 2,4-DCAA	,,		,,	24.0-135	<del></del>	81.4	%	

North Creek Analytical - Bothell





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ONTEAND = (303) 900-9200 = TAX 900-9210

Tetra Tech. Inc.

600 University St., Suite 800

Project Number: 10022-03

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Received: 9/

d: 9/3/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

Reported: 9/28/98 17:46

# Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

Analyse		Dest	Date	D-+-	C	Danamiaa			
Page   Page	Analysa	Batch	Date	Date	Surrogate	Reporting	Decul	Units	Notec*
Acctone         0980 188         9/5/98         15/98         10.0         ND         ug/l           Benzene         "         "         "         1.00         ND         "           Bromochoromethane         "         "         1.00         ND         "           Bromochforomethane         "         "         1.00         ND         "           Bromoform         "         "         "         1.00         ND         "           Bromomethane         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanone         "         "         "         1.00         ND         "           2-Butanone         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "	Anaiyte	Number	Prepared	Analyzed	Limits	Limit	Kesun	Omes	Notes
Acctone         0980 188         9/5/98         15/98         10.0         ND         ug/l           Benzene         "         "         "         1.00         ND         "           Bromochoromethane         "         "         1.00         ND         "           Bromochforomethane         "         "         1.00         ND         "           Bromoform         "         "         "         1.00         ND         "           Bromomethane         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanon         "         "         "         1.00         ND         "           2-Butanone         "         "         "         1.00         ND         "           2-Butanone         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "         "	090198-BIL-MW3-GW-01			B80908	89-01			Water	
Benzenc         " " " " " " " " " " " " " " " " " " "		. 0980188	9/5/98		<del></del>	10.0	ND		
Bromobenzene         " " " " " " " " " " " " " " " " " " "	Benzene		**				ND		
Bromochloromethane         """ """ """ """ """ """ """ """ """ ""	Bromobenzene	"	**	••			ND	•	
Stromoform	Bromochloromethane	11	h	••			ND	**	
Solution   Solution	Bromodichloromethane	11	н	••			ND	•	
Solidination	Bromoform	"	••	11		1.00	ND	**	
Buylbenzen	Bromomethane	n	n	••		1.00	ND	**	
Sec-Butylbenzene	2-Butanone	11	11	**		10.0	ND	11	
Carbon disulfide	n-Butylbenzene	**	**	**		1.00	ND	**	
Carbon disulfide	sec-Butylbenzene	н	"	11		1.00	ND		
Carbon tetrachloride	tert-Butylbenzene	n	"	•		1.00	ND		
Non-thorestance	Carbon disulfide	U	11	D		1.00	ND	••	
Chlorocthane Chlor	Carbon tetrachloride	"	•	19		1.00	ND	"	
Chloroform " " " " 1.00 ND " Chloroform " " 1.00 ND " Chloroform " " " 1.00 ND " 2-Chlorotoluene " " 1.00 ND " 1.00	hlorobenzene'	ti .	n	**		1.00	ND	•	
Chloromethane         " " " " " " " " " " " " " " " " " " "	Chloroethane	u	•	**		1.00	ND	•	•
2-Chlorotoluene       " " " " " " " " " " " " " " " " " " "	Chloroform	11	•	11		1.00	ND		
4-Chlorotoluene	Chloromethane	•		11		5.00	ND		
Dibromochloromethane         " " " " " " " " " " " " " " " " " " "	2-Chlorotoluene	49	**	**		1.00	ND	••	
1.2-Dibromo-3-chloropropane       " " " " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND " " 1.00 ND "	4-Chlorotoluene	"	**	**		1.00	ND	••	
1.2-Dibromoethane       """"""""""""""""""""""""""""""""""""	Dibromochloromethane	"		11		1.00	ND	"	
Dibromomethane         """"""""""""""""""""""""""""""""""""	1.2-Dibromo-3-chloropropane	"	"	**		5.00	ND	"	
1.2-Dichlorobenzene   1.00	1.2-Dibromoethane	**	**			1.00	ND	••	
1.3-Dichlorobenzene       " " " " " 1.00 ND " "         1.4-Dichlorobenzene       " " " " 1.00 ND "         Dichlorodifluoromethane       " " " 1.00 ND "         1.1-Dichloroethane       " " " 1.00 ND "         1.2-Dichloroethane       " " " 1.00 ND "         1.1-Dichloroethene       " " " 1.00 ND "         1.1-Dichloroethene       " " " 1.00 ND "         cis-1.2-Dichloroethene       " " " 1.00 ND "         trans-1.2-Dichloroethene       " " " 1.00 ND "         1.2-Dichloropropane       " " " 1.00 ND "         1.2-Dichloropropane       " " " 1.00 ND "         1.3-Dichloropropane       " " " 1.00 ND "         1.1-Dichloropropene       " " " 1.00 ND "	Dibromomethane	0	11	n		1.00	ND	•	
1.4-Dichlorobenzene " " " " 1.00 ND " 1.100 ND " 1.1-Dichlorodifluoromethane " " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloroethane " " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " " 1.00 ND " 1.0	1.2-Dichlorobenzene	"	"	•		1.00	ND	"	
Dichlorodifluoromethane	1.3-Dichlorobenzene	"	*1	v		1.00	ND	**	
1.1-Dichloroethane	1.4-Dichlorobenzene	11	**	H		1.00	ND	**	
1.2-Dichloroethane       " " " " " 1.00 ND " "         1.1-Dichloroethene       " " " 1.00 ND " "         cis-1.2-Dichloroethene       " " " 1.00 ND " "         trans-1.2-Dichloroethene       " " " 1.00 ND " "         1.2-Dichloropropane       " " " 1.00 ND " "         1.3-Dichloropropane       " " " 1.00 ND " "         2.2-Dichloropropane       " " " 1.00 ND " "         1.1-Dichloropropene       " " 1.00 ND " "         cis-1.3-Dichloropropene       " " " 1.00 ND " "	Dichlorodifluoromethane	n.	•			1.00	ND	••	•
1.1-Dichloroethane 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloroethene 1.1-Dichloropropane 1.1-Dichloropr	1.1-Dichloroethane	**	*1	<b></b>		1.00	ND	"	
cis-1.2-Dichloroethene       " " " " " 1.00 ND " "         trans-1.2-Dichloroethene       " " " 1.00 ND " "         1.2-Dichloropropane       " " " 1.00 ND " "         1.3-Dichloropropane       " " " 1.00 ND " "         2.2-Dichloropropane       " " " 1.00 ND " "         1.1-Dichloropropene       " " " 1.00 ND " "         cis-1.3-Dichloropropene       " " " 1.00 ND " "	1.2-Dichloroethane	**	**	D.		1.00	ND	n	
trans-1,2-Dichloroethene " " " " 1.00 ND " 1.2-Dichloropropane " " " 1.00 ND " 1.3-Dichloropropane " " " " 1.00 ND " 1.00 ND " 1.00 ND " 1.00 ND " 1.00 ND " 1.00 ND " 1.1-Dichloropropane " " " " 1.00 ND " 1.00 ND " 1.00 ND " 1.1-Dichloropropene " " " " 1.00 ND " 1.0	1.1-Dichloroethene	**	**	11		1.00	ND	н	
1.2-Dichloropropane       " " " " 1.00 ND "         1.3-Dichloropropane       " " " 1.00 ND "         2.2-Dichloropropane       " " 1.00 ND "         1.1-Dichloropropene       " " 1.00 ND "         cis-1.3-Dichloropropene       " " 1.00 ND "	cis-1.2-Dichloroethene	"	u			1.00	ND	•	
1.3-Dichloropropane       " " " " 1.00 ND "         2.2-Dichloropropane       " " " 1.00 ND "         1.1-Dichloropropene       " " " 1.00 ND "         cis-1.3-Dichloropropene       " " " 1.00 ND "	trans-1,2-Dichloroethene	11	**	**		1.00	ND	n	
1.3-Dichloropropane       " " " " 1.00 ND "         2.2-Dichloropropane       " " " 1.00 ND "         1.1-Dichloropropene       " " 1.00 ND "         cis-1.3-Dichloropropene       " " 1.00 ND "	1.2-Dichloropropane	"	"				ND	н	
2.2-Dichloropropane       " " " 1.00 ND "         1.1-Dichloropropene       " " 1.00 ND "         cis-1.3-Dichloropropene       " " 1.00 ND "	1.3-Dichloropropane	n	0			1.00	ND	11	
1.1-Dichloropropene       " " " " 1.00 ND "         cis-1.3-Dichloropropene       " " 1.00 ND "	2.2-Dichloropropane	P	**	ñ		1.00	ND	**	
cis-1.3-Dichloropropene " " " 1.00 ND "	1.1-Dichloropropene			"			ND	**	
	cis-1.3-Dichloropropene	н	н	"		1.00	ND		
dans-ti-pipinoropropend LOV ND	trans-1.3-Dichloropropene	**	н	0		1.00	ND	u u	

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manager



PORTLAND • (503) 906-9200 • FAX 906-921

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800 Seattle, WA 98101

Project Number:

10022-03

Received: 9/3/98

Project Manager:

Carlotta Cellucci

Reported: 9/28/98 17:46

#### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01 (continued)			B8090	<u>89-01</u>			<u>Water</u>	
Ethylbenzene	0980188	9/5/98	9/5/98		1.00	ND	ug/l	
Hexachlorobutadiene	H	н	o		1.00	ND	"	
2-Hexanone	н	n	••		10.0	ND	**	
Isopropylbenzene	**	"	"		1.00	ND	"	
p-Isopropyltoluene	**	n	"		1.00	ND	ч	
Methylene chloride	11	n	"		5.00	ND	et .	
4-Methyl-2-pentanone	11		**		10.0	ND	"	
Naphthalene	10		••		1.00	ND	**	
n-Propylbenzene	11	11	"		1.00	ND	11	
Styrene	n	•	**		1.00	ND	**	
1.1,1,2-Tetrachloroethane	11	n			1.00	ND	••	
1,1.2,2-Tetrachloroethane	II .	н			1.00	ND	••	
Tetrachloroethene	п	n	**		1.00	6.62	11	
Toluene	**	•	"		1.00	ND		
1.2.3-Trichlorobenzene	**	11			1.00	ND	**	
1.2.4-Trichlorobenzene	n	U			1.00	ND	**	
1.1.1-Trichloroethane	н	**	H		1.00	ND	D.	
1.1.2-Trichloroethane	11	**	**		1.00	ND	11	
Trichloroethene	**	.,	"		1.00	ND	P7	
Trichlorofluoromethane	"	**	"		1.00	ND	11	
1.2.3-Trichloropropane	"		"		1.00	ND		
1.2.4-Trimethylbenzene	"	*11			1.00	ND	н	
1.3.5-Trimethylbenzene	"				1.00	ND	**	
Vinyl chloride	**	**	11		1.00	ND	"	
m.p-Xylene	**	11	11		2.00	ND	n.	
o-Xylene	"	11	11		1.00	ND	n	
Surrogate: 2-Bromopropene	n	<i>,</i>		80.0-120		95.0	%	
Surrogate: 1,2-DCA-d4	"	"	· <b>"</b>	80.0-120		109	"	
Surrogate Toluene-d8	"	"	"	80.0-120		95.0	"	
Surrogate: 4-BFB	"	"	"	80.0-120		99.5	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang Project Manager



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.

600 University St., Suite 800

Seattle. WA 98101

Project: Br

Bradford Island Landfill

Project Number: 10022-03

Project Manager: Carlotta Cellucci

Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Reported: 9/28/98 17:46

## Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			•
Analyte .	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes
090198-BIL-MW4-GW-01			<u>B8090</u> 3	89-02			<u>Water</u>	
Acetone	0980188	9/5/98	9/5/98	<u>02-V2</u>	10.0	ND	ug/l	
Benzene	"	"	"		1.00	ND	"	
Bromobenzeńe	"		"		1.00	ND		
Bromochloromethane		11	,,		1.00	ND	11	
Bromodichloromethane	"	u	n		1.00	ND	**	
Bromoform	H	n	11		1.00	ND	n	
Bromomethane	11	"			1.00	ND	n	
2-Butanone	**	11	,,		10.0	ND	•	
n-Butylbenzene	n	н	11		1.00	ND	н	
sec-Butylbenzene	n	H	11		1.00	ND	n .	
tert-Butylbenzene	11	n			1.00	ND	"	
Carbon disulfide	II .	н	н		1.00	ND		
Carbon disumde	11	11	11		1.00	ND	n	
hlorobenzene	"				1.00	ND	n	
Chloroethane	n	н	н		1.00	ND	11	4
Chloroform	**	**	11		1.00	ND	**	
Chloromethane	"		**		5.00	ND	10	
2-Chlorotoluene	.,	**	,,		1.00	ND	11	
4-Chlorotoluene	0	n	11		1.00	ND	n	
Dibromochloromethane		11			1.00	ND	**	
	u	**	•1		5.00	ND	n	
1.2-Dibromo-3-chloropropane		.,			1.00	ND	н	
1.2-Dibromoethane Dibromomethane		11	**		1.00	ND		
	.,	,,	**		1.00	ND	n	
1.2-Dichlorobenzene	"		10		1.00	ND	**	
1.3-Dichlorobenzene	a		,,		1.00	ND ND	"	
1.4-Dichlorobenzene					1.00	ND ND	11	
Dichlorodifluoromethane			••		1.00	ND ND	н	
1.1-Dichloroethane					1.00	ND ND	11	
1.2-Dichloroethane					1.00	ND ND	11	
1.1-Dichloroethene	**	"	,,				11	
cis-1.2-Dichloroethene					1.00	ND	"	
trans-1.2-Dichloroethene	"		"		1.00	ND	 H	
1.2-Dichloropropane	"	"	"		1.00	ND	,,	
1.3-Dichloropropane		**			1.00	ND	"	
2.2-Dichloropropane	н				1.00	ND		
1.1-Dichloropropene	••	**	**		1.00	ND		
cis-1,3-Dichloropropene	"	**	"		1.00	ND		
trans-1.3-Dichloropropene	••		••		1.00	ND	**	

orth Creek Analytical - Bothell





PORTLAND - (503) 906-9200 - FAX 906-921

Tetra Tech, Inc. 600 University St., Suite 800

Project:

Bradford Island Landfill 10022-03

Sampled: 9/1/98 to 9/2/98 9/3/98

Seattle, WA 98101

Project Number: Project Manager: Carlotta Cellucci Received:

9/28/98 17:46 Reported:

# Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			<del></del>
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW4-GW-01 (continued)			B80908	89-02			<u>Water</u>	
Ethylbenzene	0980188	9/5/98	9/5/98	<del></del>	1.00	ND	ug/l	
Hexachlorobutadiene	н	"	**		1.00	ND	"	
2-Hexanone	н		"		10.0	ND	11	
Isopropylbenzene	**	**			1.00	ND	10	
p-Isopropyltoluene	"				1.00	ND	11	
Methylene chloride	*1	••	••		5.00	ND		
4-Methyl-2-pentanone	**	••	••		10.0	ND	li	
Naphthalene	"		"		1.00	ND	**	
n-Propylbenzene	•	11	**		1.00	ND		
Styrene		17	**		1.00	ND	II.	
1.1.1.2-Tetrachloroethane	n .	**			1.00	ND	,,	
1.1.2.2-Tetrachloroethane		**	,,		1.00	ND	•	
Tetrachloroethene		**			1.00	ND	n	
Toluene	n .	**			1.00	1.11	n	{
1.2.3-Trichlorobenzene	u u	**	••		1.00	ND	••	
1.2.4-Trichlorobenzene	· ·	**	**		1.00	ND	**	
1.1.1-Trichloroethane		n	••		1.00	ND	н	
1.1.2-Trichloroethane		н			1.00	ND	"	
Trichloroethene	**		0		1.00	ND	•	
Trichlorofluoromethane	H	н	er e		1.00	ND	**	
1.2.3-Trichloropropane	**	**	**		1.00	ND	**	
1.2.4-Trimethylbenzene	11	н	**		1.00	ND	,,	
1.3.5-Trimethylbenzene	0	н	••		1.00	ND	**	
Vinyl chloride	"	"	11		1.00	ND	a	
m.p-Xylene	n	n	U		2.00	ND	"	
o-Xylene	"	н	**		1.00	ND	и	
Surrogate. 2-Bromopropene	"	"	"	80.0-120		94.0	%	
Surrogate: 1,2-DCA-d4	•	"	"	80.0-120		110	"	
Surrogate: Toluene-d8	"	"	"	80.0-120		95.5	"	
Surrogate: 4-BFB	"	"		80.0-120		98.5	"	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

viect Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S W. Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Sampled: 9/1/98 to 9/2
Received: 9/3/98

Seattle, WA 98101

Project Number: Project Manager:

Carlotta Cellucci

10022-03

Reported: 9/28/98 17:46

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		_	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
access But Maria Christia							11/ - 4	
090298-BIL-MW2-GW-01	0000100	0.15.100	B80908	<u>89-03</u>	10.0	ND	<u>Water</u>	
Acetone	0980188	9/5/98	9/5/98		10.0	ND	ug/l "	
Benzene	93	"	,,		1.00	ND	н	
Bromobenzene	,,	" "	11		1.00	ND		
Bromochloromethane	"	"	11		1.00	ND	"	
Bromodichloromethane	"	"			1.00	ND		
Bromoform			11		1.00	ND		
Bromomethane	11	"	u		1.00	ND	H	
2-Butanone	TI .	"	И		10.0	ND	U	
n-Butylbenzene	н	H	"		1.00	ND	H .	
sec-Butylbenzene	"	11	**		1.00	ND	n	
tert-Butylbenzene	"		"		1.00	ND	**	
Carbon disulfide	**	17	ti.		1.00	ND	"	
Carbon tetrachloride	11	ti	н		1.00	ND	29	
hlorobenzene	44	"	**	•	1.00	ND	11	
Chloroethane		**	•		1.00	ND	"	¥
Chloroform	o o	**	**		1.00	ND	н	
Chloromethane	**	"	•		5.00	ND	D	
2-Chlorotoluene	**	"	**		1.00	ND	n	
4-Chlorotoluene	*1	"	••		1.00	ND	**	
Dibromochloromethane	11	**	**		1.00	ND	n	
1.2-Dibromo-3-chloropropane	11	n	н		5.00	ND	n .	
1.2-Dibromoethane	*1	"	**		1.00	ND	H	
Dibromomethane	•	•	11		1.00	ND	11	
1.2-Dichlorobenzene	n	**	11		1.00	ND	"	
1.3-Dichlorobenzene		•	*1		1.00	ND	**	
1.4-Dichlorobenzene	"		н		1.00	ND	11	
Dichlorodifluoromethane	*1		**		1.00	ND	11	
1.1-Dichloroethane	16.	п	11		1.00	ND	**	
1.2-Dichloroethane	n .		**		1.00	ND	11	
1.1-Dichloroethene	•		U		1.00	ND	"	
cis-1.2-Dichloroethene	0				1.00	ND	н	
trans-1,2-Dichloroethene	44	**			1.00	ND	11	
1.2-Dichloropropane	11		н		1.00	ND	11	
1.3-Dichloropropane		11			1.00	ND	**	
2.2-Dichloropropane	**	"	"		1.00	ND ND	••	
	11	**				ND ND		
1.1-Dichloropropene					1.00		n	
cis-1.3-Dichloropropene					1.00	ND	n H	
trans-1,3-Dichloropropene	,,				1.00	ND		

orth Creek Analytical - Bothell

Joy B Chang, Project Munager

<sup>\*</sup>Refer to end of report for text of notes and definitions.



PORTLAND - (503) 906-9200 - FAX 906-921(

Tetra Tech, Inc.

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03 Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

# Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090298-BIL-MW2-GW-01 (continued)			<u>B80908</u>	<b>39-03</b>			<u>Water</u>	
Ethylbenzene	0980188	9/5/98	9/5/98		1.00	ND	ug/l	
Hexachlorobutadiene	**	"	**		1.00	ND	,, _	
2-Hexanone	u	"	••		10.0	ND	**	
Isopropylbenzene	n	н	"		1.00	ND	10	
p-Isopropyltoluene	n	,,	"		00.1	ND	**	
Methylene chloride	н	n	11		5.00	5.24	19	1
4-Methyl-2-pentanone	n	"	11		10.0	ND	**	
Naphthalene	O .	n	••		1.00	ND	**	
n-Propylbenzene	н	n			1.00	ND	11	
Styrene	"	•	**		1.00	ND	10	
1.1.1.2-Tetrachloroethane	o o	**			1.00	ND	tr.	
1.1.2.2-Tetrachloroethane		"			1.00	ND	**	
Tetrachloroethene		u	**		1.00	ND	**	
Toluene	н	"	**		1.00	ND	H	(
1.2.3-Trichlorobenzene	"	**	••		1.00	ND	tt	
1.2.4-Trichlorobenzene	"	**	••		1.00	ND		
1.1.1-Trichloroethane	11	**	••		1.00	ND	) r	
1.1.2-Trichloroethane	u	**	**		1.00	ND		
Trichloroethene	"	**	•		1.00	ND	**	
Trichlorofluoromethane	11	**	**		1.00	ND	"	
1.2.3-Trichloropropane	**	"			1.00	ND		
1.2.4-Trimethylbenzene	·		**		1.00	ND		
1.3.5-Trimethylbenzene	••	ı,	n		1.00	ND	,,	
Vinyl chloride	**	"	•		1.00	ND	n	
m.p-Xylene	"	**			2.00	ND	**	
o-Xylene	11	•	"		1.00	ND	**	
Surrogate: 2-Bromopropene	"	"	"	80.0-120		92.5	%	
Surrogate: 1,2-DCA-d4	,,	"	"	80.0-120		109	"	
Surrogate: Toluene-d8	"	"	"	80.0-120		94.5	"	
Surrogate: 4-BFB	"	,,	"	80.0-120		99.5	**	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang Project Manage

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton, OR 97008-7132



PORTLAND • (503) 906-9200 • FAX 906-9210

9/1/98 to 9/2/98 Tetra Tech, Inc. Bradford Island Landfill Sampled: Project: 600 University St., Suite 800 Project Number: 10022-03 Received: 9/3/98 Seattle, WA 98101

Project Manager: Carlotta Cellucci Reported: 9/28/98 17:46

#### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
,								_
090198-BIL-MW5-GW-01			<u>B80908</u>	<u>89-04</u>	a service of		<u>Water</u>	
Acetone	0980188	9/5/98	9/5/98		10.0	ND	ug/l	
Benzene	"	н	"		1.00	ND	0	
Bromobenzene	"	11	درر ۱۱	ı	1.00	ND	n	
Bromochloromethane	11	11			i.00	ND	•	
Bromodichloromethane	17	h	n		1.00	ND	**	
Bromoform	"	"	"		1.00	ND	н -	
Bromomethane	11	**	"		1.00	ND	11	
2-Butanone	•	•	••		10.0	ND	**	
n-Butylbenzene	ri	11	"		1.00	ND	H	
sec-Butylbenzene	11	**	n		1.00	ND		
tert-Butylbenzene	"	**	"		1.00	ND	,,	
Carbon disulfide	n	п	**		1.00	ND		
Carbon tetrachloride		**	**		1.00	ND	n	
hlorobenzene	"		**		1.00	ND	D.	
Chloroethane	11	n .	•		1.00	ND		
Chloroform	n	**	n		1.00	ND	**	•
Chloromethane	**	n	11		5.00	ND	**	
2-Chlorotoluene		11	**		1.00	ND		
4-Chlorotoluene	,,	**	H		1.00	ND		
Dibromochloromethane	•		n		1.00	ND	n	
1.2-Dibromo-3-chloropropane			**		5.00	ND	es	
1.2-Dibromoethane	11	11	**		1.00	ND	•	
Dibromomethane	a .	"	"		1.00	ND	н	
1.2-Dichlorobenzene	17	17	**		1.00	ND	**	
1.3-Dichlorobenzene	**	н	*1		1.00	ND		
1.4-Dichlorobenzene	**	**			1.00	ND	**	
Dichlorodifluoromethane	te .	•1			1.00	ND		
1.1-Dichloroethane		11			1.00	ND	**	
1.2-Dichloroethane	•		**		1.00	ND	**	
1.1-Dichloroethene					1.00	ND		
cis-1.2-Dichloroethene	**	11			1.00	ND ND	**	
trans-1.2-Dichloroethene	**	**			1.00			
1.2-Dichloropropane		n	**			ND ND	•	
					1.00		u	
1.3-Dichloropropane	••	,,			1.00	ND	"	
2.2-Dichloropropane			 D		1.00	ND ·	n	
1.1-Dichloropropene		,,			1.00	ND	"	
cis-1.3-Dichloropropene	"	"	"	•	1.00	ND		
trans-1.3-Dichloropropene	••				1.00	ND	"	

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98 Received: 9/3/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

Carlotta Cellucci

Reported: 9/28/98 17:46

# Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01 (continued)			B80908	<u>89-04</u>			<u>Water</u>	
Ethylbenzene	0980188	9/5/98	9/5/98		1.00	ND	ug/l	
Hexachlorobutadiene	11	o o			1.00	ND	**	
2-Hexanone	n	н	**		10.0	ND	R	
Isopropylbenzene	11	"	н		1.00	ND	**	
p-lsopropyltoluene	"				1.00	ND	"	
Methylene chloride	п	"	"		5.00	ND	n	
4-Methyl-2-pentanone	n	"	**		10.0	ND		
Naphthalene	"	••	**		1.00	ND	19	
n-Propylbenzene		**	**		1.00	ND	16	
Styrene	"	**			1.00	ND	**	
1.1.1.2-Tetrachloroethane	"		**		1.00	ND	<b>91</b>	
1.1.2.2-Tetrachloroethane	n	"	**		1.00	ND	11	
Tetrachloroethene	"	"	"		1.00	ND	**	
foluene	**	**			1.00	ND	**	
1.2.3-Trichlorobenzene	II .	· ·			1.00	ND	"	
1.2.4-Trichlorobenzene	"	н	,,		1.00	ND	u	
1.1.1-Trichloroethane	n	"			1.00	ND	"	
1.1.2-Trichloroethane		••	**		1.00	· ND	"	
Trichloroethene	**	11	**		1.00	ND	**	
Trichlorofluoromethane	•	••	••		1.00	ND	н	
1.2.3-Trichloropropane	"	**			1.00	ND	II .	
1.2.4-Trimethylbenzene	п	"	4		1.00	ND	"	
1.3.5-Trimethylbenzene	"	**	,,		1.00	ND	11	
Vinyl chloride	"	*1			1.00	ND	11	
m.p-Xylene	**	11			2.00	ND	**	
o-Xylene	n	н	51		1.00	ND	•	
Surrogate: 2-Bromopropene	"	"	"	80.0-120		83.0		
Surrogate: 1,2-DCA-d4		"	"	80.0-120		108	"	
Surrogate: Toluene-d8	,,	"	"	80.0-120		94.0	"	
Surrogate: 4-BFB	n	"	"	80.0-120		100	"	

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang/Project Manager



PORTLAND = (503) 906-9200 = FAX 906-921/

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<u> </u>	•
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
TRIP BLANK			B8090	89-05			<u>Water</u>	
Acetone	0980188	9/5/98	9/6/98	<del></del>	10.0	ND	ug/l	
Benzene	**	"	11		1.00	ND	"	
Bromobenzene	••	"	11		1.00	ND -	**	
Bromochloromethane	"	**	•		1.00	ND	11	
Bromodichloromethane	**	*1	н		1.00	ND	n	
Bromoform	ti .	"	t <del>)</del>		1.00	ND	u .	
Bromomethane	u	••	н		1.00	ND	**	
2-Butanone	"	••	**		10.0	ND	••	
n-Butylbenzene	**	**	n		1.00	ND	10	
sec-Butylbenzene	11	**	**		1.00	ND	n	
tert-Butylbenzene	**	"	0		1.00	ND	tt	
Carbon disulfide	"	**	n .		1.00	2.29	••	
Carbon tetrachloride	"	**	n		1.00	ND	n	<i>~</i> .
Chlorobenzene	11		11		1.00	ND	II.	
Chloroethane	**	**	••		1.00	ND	н	<b>\</b>
Chloroform	H		**		1.00	ND	ч	
Chloromethane	11	· ·	11		5.00	ND	"	
2-Chlorotoluene	<i>"</i>	**	**		1.00	ND	"	
4-Chlorotoluene	•	**	0		1.00	ND	"	
Dibromochloromethane	"	11	**		1.00	ND	**	
1.2-Dibromo-3-chloropropane	•	11	**		5.00	ND	н	
1.2-Dibromoethane	•	**	**		1.00	ND	н	
Dibromomethane	"	**	н		1.00	ND	"	
1.2-Dichlorobenzene	ч	"	••		1.00	ND	н	
1.3-Dichlorobenzene		"			1.00	ND		
1.4-Dichlorobenzene	**	**	0		1.00	ND	11	
Dichlorodifluoromethane	"	**	u		1.00	ND	**	
1.1-Dichloroethane	"	**	•		1.00	ND	н	
1.2-Dichloroethane	**	17			1.00	ND	**	
1.1-Dichloroethene	n	**	P		1.00	ND	n	
cis-1.2-Dichloroethene	**				1.00	ND	*1	
trans-1.2-Dichloroethene		••	**		1.00	ND	п	
1.2-Dichloropropane	••	н	••		1.00	ND	10	
1.3-Dichloropropane	H	n	.,		1.00	ND	**	
2.2-Dichloropropane	н .	**	.,		1.00	ND	II	
1.1-Dichloropropene	**		**		1.00	ND ·	H	
cis-1.3-Dichloropropene	"	n	••		1.00	ND	H	
trans-1.3-Dichloropropene	**				1.00	ND	*1	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang Project Manager

13939 120th Avenue N E., Suite 101, Bothell, WA 98011-9508
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 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Volatile Organic Compounds by EPA Method 8260B North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<del></del>	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
TRIP BLANK (continued)			B8090	89-05			<u>Water</u>	
Ethylbenzene	0980188	9/5/98	9/6/98	22.00	1.00	ND	ug/l	
Hexachlorobutadiene	**	"			1.00	ND	11	
2-Hexanone	••	**	•		10.0	ND	н	
Isopropylbenzene	**				1.00	ND	n	
p-lsopropyltoluene	"				1.00	ND	n	
Methylene chloride	tt	U			5.00	7.91	11	1
4-Methyl-2-pentanone	11	11	•		10.0	ND		
Naphthalene	"	"	n		1.00	ND	11	
n-Propylbenzene	n	**	19		1.00	ND	11	
Styrene	11	0	0		1.00	ND	11	
1.1.1.2-Tetrachloroethane	U		**		1.00	ND		
1,1.2.2-Tetrachloroethane	II .	*			1.00	ND		
Tetrachloroethene	•	**	**		1.00	ND	**	
Foluene	**		n .		1.00	ND	"	
1.2.3-Trichlorobenzene	11	10	**		1.00	ND	п	
1.2.4-Trichlorobenzene	"	11	•		1.00	ND	н	
1.1.1-Trichloroethane	U	**	**		1.00	ND	11	
1.1.2-Trichloroethane	"	11	**		1.00	ND	n	
Trichloroethene	"	п	•		1.00	ND	н	
Trichlorofluoromethane	·	n	н		1.00	ND	н	
1.2.3-Trichloropropane	n	••			1.00	ND	11	
1.2.4-Trimethylbenzene	n	n	51		1.00	ND		
1.3.5-Trimethylbenzene		"	n		1.00	ND		
Vinyl chloride	D	**	11		1.00	ND	n	
m.p-Xylene	u	"	"		2.00	ND	15	
o-Xylene	**	H.	U		1.00	ND	н	
Surrogate: 2-Bromopropene	"	* "	"	80.0-120		91.0	%	
Surrogate: 1.2-DCA-d4	"	"	"	80.0-120		113	"	
Surrogate: Toluene-d8	"	"	"	80.0-120		95.5	11	
Surrogate: 4-BFB	"	"	"	80.0-120		97.0	"	

iorth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.

Joy B Chang. t Manager



PORTLAND - (503) 906-9200 - FAX 906-921

Tetra Tech, Inc.

Seattle, WA 98101

600 University St., Suite 800

Project: Bradford Island Landfill Project Number:

Project Manager:

10022-03 Carlotta Cellucci Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

9/28/98 17:46 Reported:

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			· <u> </u>
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
000100 PH 1012 CW 01								
090198-BIL-MW3-GW-01	0000102	0.45.400	<u>B80908</u>	<u>89-01</u>	10.0	\D	<u>Water</u>	
Acenaphthene	0980182	9/5/98 "	9/14/98		10.0	ND	ug/l "	
Acenaphthylene	**	"	"		10.0	ND		
Aniline	"				10.0	ND		
Anthracene		"	H		10.0	ND	**	
Benzoic Acid	**	"	н		20.0	ND	**	
Benzo (a) anthracene	"	U	n		5.00	ND	"	
Benzo (b) fluoranthene	,,		**		5.00	ND	er .	
Benzo (k) fluoranthene	11	**	**		5.00	ND	"	
Benzo (ghi) perylene	11	11	"		5.00	ND	"	
Benzo (a) pyrene	11	"	11		5.00	ND	"	
Benzyl alcohol	D	11	lt .		10.0	ND	11	
Bis(2-chloroethoxy)methane	11	**	**		10.0	ND	,,	
Bis(2-chloroethyl)ether	u	**	••		10.0	ND	"	
Bis(2-chloroisopropyl)ether	•	**	••		10.0	ND.	**	(
Bis(2-ethylhexyl)phthalate	**	41	•		20.0	ND		<b>~</b>
4-Bromophenyl phenyl ether	н	IF	11		10.0	ND	**	
Butyl benzyl phthalate	**	**	R		5.00	ND	**	
Carbazole	••	**	**		10.0	ND	11	
4-Chloroaniline		**			5.00	ND	**	
2-Chloronaphthalene	11	••	•		10.0	ND	"	
4-Chloro-3-methylphenol	31	IJ	,,		10.0	ND		
2-Chlorophenol	11	**	11		10.0	ND	11	
4-Chlorophenyl phenyl ether	u	11			10.0	ND	u	
Chrysene	•	11	"		5.00	ND	**	
Dibenz (a.h) anthracene		,,	••		5.00	ND		
Dibenzofuran	**	"	•		10.0	ND	••	
Di-n-butyl phthalate	n	**	**		5.00	ND		
1.3-Dichlorobenzene	n	**	.,		5.00	ND	**	
1.4-Dichlorobenzene	n	11	**		5.00	ND	"	
1.2-Dichlorobenzene		"	**		5.00	ND ND	"	
3.3'-Dichlorobenzidine	••	,,			20.0	ND ND	,,	
2.4-Dichlorophenol	n	,,	••				"	
Diethyl phthalate	"	,,			10.0	ND		
- •	. ,,		"		10.0	ND	" #	
2.4-Dimethylphenol	**	"	.,	•	10.0	ND	"	
Dimethyl phthalate	"	"			10.0	ND		
4.6-Dinitro-2-methylphenol			**		10.0	ND		
2.4-Dinitrophenol	••	**	**		10.0	ND	"	
2.4-Dinitrotoluene	19		"		10.0	ND	0	•

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang Pr

Page 24 of 51



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci Reported: 9/28/98 17:46

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes'
090198-BIL-MW3-GW-01 (continued)			B80908	R9-01			Water	
2.6-Dinitrotoluene	0980182	9/5/98	9/14/98		10.0	ND	ug/l	
Di-n-octyl phthalate	0	11	11		5.00	ND	"	
Fluoranthene	n	•	11		5.00	ND	"	
Fluorene	n	••	"		10.0	ND	H	
Hexachlorobenzene		**	"		10.0	ND	н	
Hexachlorobutadiene	"	**	**		5.00	ND	**	
Hexachlorocyclopentadiene	11		11		5.00	ND	n	
Hexachloroethane	"	11	••		10.0	ND	n	
Indeno (1.2.3-cd) pyrene	11		**		5.00	ND	"	
Isophorone	н	**	•		10.0	ND	n	
2-Methylnaphthalene	**		Ħ		10.0	ND	11	
2-Methylphenol	"	•	"		10.0	ND	11	
3 & 4-Methylphenol	0	n	"		10.0	ND	11	
aphthalene		•	••		10.0	ND	H	
2-Nitroaniline	"	"	tı .		20.0	ND	9	
3-Nitroaniline	н	"	11		10.0	ND	"	
4-Nitroaniline	"	**	••		10.0	ND	11	
Nitrobenzene	••	**	tı.		10.0	ND	n	
2-Nitrophenol	tr	••	H		5.00	ND	11	
4-Nitrophenol	11	•	11		10.0	ND	"	
N-Nitrosodiphenylamine	11	rı			10.0	ND	n	
N-Nitrosodi-n-propylamine	"	**	11		10.0	ND	•	
Pentachlorophenol	н	"	tı		10.0	ND		
Phenanthrene	"	H	i te		10.0	ND	p	
Phenol	"	**	10		10.0	ND	•	
Pyrene	"	••	4		5.00	ND	n	
1.2.4-Trichlorobenzene			n		5.00	ND	10	
2.4.5-Trichlorophenol	•	н	"		10.0	ND	··	
2.4.6-Trichlorophenol	"		**		10.0	ND	11	
Surrogate: 2-FP	,,		· · · · · · · · · · · · · · · · · · ·	40.0-115		58.0	<del>%</del>	
Surrogate: Phenol-d6	"	"	"	18.0-145		58.2	,,	
Surrogate: 2,4,6-TBP	"	"	"	24.0-130	•	74.8	"	
Surrogate: Nitrobenzene-d5	"	"	"	42.0-110		67.0	n	
Surrogate: 2-FBP	"	"	"	46.0-116		84.5	"	
Surrogate: p-Terphenyl-d14	n	"	,,	63.0-117		89.5	"	

orth Creek Analytical - Bothell





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech, Inc.

Project: Bradford Island Landfill Project Number: 10022-03

Sampled:

Received:

9/1/98 to 9/2/98 9/3/98

Seattle, WA 98101

600 University St., Suite 800

Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW4-GW-01			B8090	89-02			<u>Water</u>	
Acenaphthene	0980182	9/5/98	9/14/98	<u>-</u> <del>V.F.</del>	10.0	ND	ug/l	
Acenaphthylene	"	"	"		10.0	ND	"	
Aniline		11	n		10.0	ND	n	
Anthracene	n	19	**		10.0	ND	u	
Benzoic Acid	**	11	**	•	20.0	ND	"	
Benzo (a) anthracene	**	**	11		5.00	ND	"	
Benzo (b) fluoranthene	lt.	**	10		5.00	ND	**	
Benzo (k) fluoranthene	**	"	н		5.00	ND	n	
Benzo (ghi) perylene	11	11	n		5.00	ND		
Benzo (a) pyrene	"	n	"		5.00	ND	•	
Benzyl alcohol	••	н			10.0	ND		
Bis(2-chloroethoxy)methane	**	**	**		10.0	ND	11	
Bis(2-chloroethyl)ether	**	**	**		10.0	ND	"	
Bis(2-chloroisopropyl)ether	**	**	**		10.0	ND	"	(
Bis(2-ethylhexyl)phthalate		**	11		20.0	ND	11	
4-Bromophenyl phenyl ether	u ·	••			10.0	ND	**	
Butyl benzyl phthalate	o o	*1	**		5.00	ND	**	
Carbazole	*1	••	**		10.0	ND	n	
4-Chloroaniline	11		**		5.00	ND	11	
2-Chloronaphthalene	14				10.0	ND	n	
4-Chloro-3-methylphenol	11		**		10.0	ND	**	
2-Chlorophenol	**	••			10.0	ND	**	
4-Chlorophenyl phenyl ether		**	19		10.0	ND	н	
Chrysene	"		**		5.00	ND	**	
Dibenz (a.h) anthracene	11	•	**		5.00	ND	11	
Dibenzofuran	n .	**			10.0	ND	**	
Di-n-butyl phthalate	**	**			5.00	ND	11	
1.3-Dichlorohenzene	**	D			5.00	ND		
1.4-Dichlorobenzene	**	,,	D		5.00	NĐ	"	
1.2-Dichlorobenzene	n	11			5.00	ND	"	
3.3'-Dichlorobenzidine	"	11			20.0	ND	u	
2.4-Dichlorophenol	**	**	**		10.0	ND	n .	
Diethyl phthalate	11	**	н		10.0	ND	ii.	
2.4-Dimethylphenol		11	,,		10.0	ND	**	
Dimethyl phthalate	n	n	н		10.0	ND	•	
4.6-Dinitro-2-methylphenol	"	"	u		10.0	ND	11	
2.4-Dinitrophenol.	"	**	**		10.0	ND	n	
2.4-Dinitrotoluene	••	II .	н		10.0	ND	н	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defi

Joy B Chang. roject Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton. OR 97008-7132



Tetra Tech, Inc.

Seattle, WA 98101

600 University St., Suite 800

BOTHELL • (425) 420-9200 • FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND • (503) 906-9200 • FAX 906-9210

Sampled: 9/1/98 to 9/2/98

Project Number: 10022-03 Received: 9/3/98

Project Manager: Carlotta Cellucci Reported: 9/28/98 17:46

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

Project:

Bradford Island Landfill

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW4-GW-01 (continued)			B8090	89-0 <u>2</u>			<u>Water</u>	
2.6-Dinitrotoluene	0980182	9/5/98	9/14/98		10.0	ND	ug/l	
Di-n-octyl phthalate	11	"	"		5.00	ND	19	
Fluoranthene	•	"	н		5.00	ND	11	
Fluorene	"		**		10.0	ND	"	
Hexachlorobenzene	**	**			10.0	ND	11	
Hexachlorobutadiene	"	"	"		5.00	ND	11	
Hexachlorocyclopentadiene	п	**	**		5.00	ND	*1	
Hexachloroethane	n		••		10.0	ND	**	
Indeno (1.2.3-cd) pyrene		••	**		5.00	ND	11	
Isophorone	**	**	**		10.0	ND	**	
2-Methylnaphthalene	"	н	"		10.0	ND	••	
2-Methylphenol		n	•		10.0	ND	**	
3 & 4-Methylphenol		**	"		10.0	ND	**	
laphthalene	11	"	**		10.0	ND	**	
2-Nitroaniline	**	"	"		20.0	ND	11	
3-Nitroaniline	"		**		10.0	ND	11	:7
4-Nitroaniline	11	••	**		10.0	ND	**	
Nitrobenzene	"	n	"		10.0	· ND	**	
2-Nitrophenol	11		**		5.00	ND	**	
4-Nitrophenol	11	••	**		10.0	ND	11	
N-Nitrosodiphenylamine	**		P		10.0	ND	"	
N-Nitrosodi-n-propylamine	,,	11			10.0	ND	*1	
Pentachlorophenol	**	••	"		10.0	ND	**	
Phenanthrene	11	••	•		10.0	ND	**	
Phenol	H	"	n		10.0	ND	ti .	
Pyrene		••			5.00	ND	**	
1.2.4-Trichlorobenzene	**		••		5.00	ND		
2.4.5-Trichlorophenol	u	**	**		10.0	ND	11	
2.4.6-Trichlorophenol	"	**			10.0	ND	**	
Surrogate: 2-FP	,,	"	,,	40.0-115		46.0	%	
Surrogate: Phenol-d6	"	"	"	18 0-145		56.1	"	
Surrogate: 2.4.6-TBP	,,	"	"	24.0-130		80.3	"	
Surrogate: Nurobenzene-d5	"	"	"	42.0-110		60.3	"	
Surrogate: 2-FBP	,,	"	,,	46.0-116		72.9	"	
Surrogate: p-Terphenyl-d14	"	,,	,,	63.0-117		95. <b>4</b> .	"	

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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting		<del></del>	
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090298-BIL-MW2-GW-01			B8090	RO_N3			<u>Water</u>	
Acenaphthene	0980182	9/5/98	9/14/98	<u> </u>	10.0	ND	ug/l	
Acenaphthylene	"	"	"		10.0	ND	ug/I	
Aniline	n	**	"		10.0	ND	•1	
Anthracene	**	17	11		10.0	ND	**	
Benzoic Acid	n	**	n		20.0	ND	11	
Benzo (a) anthracene	11	11			5.00	ND		
Benzo (b) fluoranthene	16				5.00	ND		
Benzo (k) fluoranthene	H		н		5.00	ND	11	
Benzo (ghi) perylene	10				5.00	ND	**	
Benzo (a) pyrene	10	**	n		5.00	ND	**	
Benzyl alcohol	"	**	n		10.0	ND	•	
Bis(2-chloroethoxy)methane	**	**	n		10.0	ND	It	
Bis(2-chloroethyl)ether	**	11			10.0	ND	H	
Bis(2-chloroisopropyl)ether			.,		10.0	ND	••	(
Bis(2-ethylhexyl)phthalate	•		n		20.0	ND	11	
4-Bromophenyl phenyl ether	n	.,	**		10.0	ND	11	
Butyl benzyl phthalate	н	0	ч	•	5.00	ND		
Carbazole	11		"		10.0	ND	,,	
4-Chloroaniline	н	**	n		5.00	ND		
2-Chloronaphthalene	n	**	n		10.0	ND	••	
4-Chloro-3-methylphenol	"	"	**		10.0	ND	"	
2-Chlorophenol	**	n	••		10.0	ND	•	
4-Chlorophenyl phenyl ether		14	,,		10.0	ND	11	
Chrysene	"	и	**		5.00	ND	н	
Dibenz (a.h) anthracene	**	··	ti .		5.00	ND		
Dibenzofuran	11	**	,,		10.0	ND	••	
Di-n-butyl phthalate	"	**			5.00	ND	"	
1.3-Dichlorobenzene	11	n			5.00	ND	n	
1.4-Dichlorobenzene	,,	"	"		5.00	ND	n .	
1.2-Dichlorobenzene	н		n		5.00	ND	•	
3.3'-Dichlorobenzidine		••			20.0	ND		
2.4-Dichlorophenol	"	**			10.0	ND	"	
Diethyl phthalate	11	"			10.0	ND	*	
2.4-Dimethylphenol	"		•		10.0	ND	,,	
Dimethyl phthalate	"	**			10.0	ND	"	
4.6-Dinitro-2-methylphenol	н	••	,,		10.0	ND	**	
2.4-Dinitrophenol		••	"		10.0	ND	**	
2.4-Dinitrotoluene	**	n			10.0	ND	n	

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Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

9/3/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			-
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090298-BIL-MW2-GW-01 (continued)			B80908	80_N 3			<u>Water</u>	
2.6-Dinitrotoluene	0980182	9/5/98	9/14/98	<u>,,-0,5</u>	10.0	ND	ug/l	
Di-n-octyl phthalate	"	"	"		5.00	ND	"	
Fluoranthene	**	"	**		5.00	ND	tt	
Fluorene	**	11	**		10.0	ND	**	
Hexachlorobenzene	n		п		10.0	ND	**	
Hexachlorobutadiene	"		••		5.00	ND	"	
Hexachlorocyclopentadiene	II .	"	**		5.00	ND	**	
Hexachloroethane	"	**	**		10.0	ND		
Indeno (1.2.3-cd) pyrene	H		10		5.00	ND	"	
Isophorone	11	**			10.0	ND	н	
2-Methylnaphthalene	n	•	17		10.0	ND	**	
2-Methylphenol	n,	**			10.0	ND	**	
3 & 4-Methylphenol	n	P	•		10.0	ND	**	_
aphthalene	11	n	n		10.0	ND	н	
2-Nitroaniline	"	**	**		20.0	ND	н	
3-Nitroaniline	11	**	ti		10.0	ND		
4-Nitroaniline	"	10	11		10.0	ND	**	
Nitrobenzene	D	••			10.0	ND	"	
2-Nitrophenol	H	**	ti .		5.00	ND	H	
4-Nitrophenol	•	•	H		10.0	ND	н	
N-Nitrosodiphenylamine	*	n	••		10.0	ND	н	
N-Nitrosodi-n-propylamine	•	**	11		10.0	ND	"	
Pentachlorophenol		n	**		10.0	ND	n	•
Phenanthrene	"	11	11		10.0	ND	n	
Phenol			**		10.0	ND	rı	
Pyrene		н	**		5.00	ND	н	
1.2.4-Trichlorobenzene	n		и		5.00	ND	"	
2.4.5-Trichlorophenol	**	n	ч		10.0	ND	n	
2.4.6-Trichlorophenol	ti .	••	ч		10.0	ND	"	
Surrogate: 2-FP	**	"	,	40.0-115		58.6	%	
Surrogate. Phenol-d6	"	"	"	18.0-145		67.9	"	
Surrogate: 2.4.6-TBP	"	"	"	24.0-130		84.5	"	
Surrogate. Nitrobenzene-d5	"	"	"	42.0-110		74.4	"	
Surrogate: 2-FBP	**	"	"	46.0-116		84.2	"	
Surrogate. p-Terphenyl-d14	"	"	"	63.0-117		86.8	,,	

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Project: Bradford Island Landfill

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Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01			B8090	89-0 <u>4</u>			<u>Water</u>	
Acenaphthene	0980182	9/5/98	9/14/98		10.0	ND	ug/l	
Acenaphthylene	"	"	н		10.0	ND	,	
Aniline		**	t+		10.0	ND	**	
Anthracene	•	"	**		10.0	ND	•	
Benzoic Acid	**	•	•		20.0	ND		
Benzo (a) anthracene	•	**	11		5.00	ND	**	
Benzo (b) fluoranthene		**	n		5.00	ND	u	
Benzo (k) fluoranthene	••	••			5.00	ND	н	
Benzo (ghi) perylene	**		"		5.00	ND	"	
Benzo (a) pyrene	•	н	**		5.00	ND	n	
Benzyl alcohol	716	н	H		10.0	ND	п	
Bis(2-chloroethoxy)methane	II.	11	n		10.0	ND	••	
Bis(2-chloroethyl)ether	11	**	"		10.0	ND	**	
Bis(2-chloroisopropyl)ether	н	**	н	•	10.0	ND	**	(
Bis(2-ethylhexyl)phthalate	**	**	**		20.0	ND	••	
4-Bromophenyl phenyl ether	11	H	"		10.0	ND	**	
Butyl benzyl phthalate	**	14	"		5.00	ND	**	
Carbazole	11	11	н		10.0	ND	**	
4-Chloroaniline	11	н	н		5.00	ND	п	
2-Chloronaphthalene	19	"	н		10.0	ND		
4-Chloro-3-methylphenol	**	"	**		10.0	ND		
2-Chlorophenol		•	**		10.0	ND	••	
4-Chlorophenyl phenyl ether	u	•	••		10.0	ND	"	
Chrysene	**	"	10		5.00	ND	11	
Dibenz (a.h) anthracene	**	**	19		5.00	ND	n	
Dibenzofuran	**	n	D .		10.0	ND	**	
Di-n-butyl phthalate	11	u	tt		5.00	ND	11	
1.3-Dichlorobenzene		н	••		5.00	ND	"	
1.4-Dichlorobenzene	u	n .	11		5.00	ND	**	
1.2-Dichlorobenzene	"	**	n		5.00	ND	14	
3.3'-Dichlorobenzidine	"	"	H		20.0	ND		
2.4-Dichlorophenol	11	и .	n		10.0	ND	**	
Diethyl phthalate	n .	п	"		10.0	ND		
2.4-Dimethylphenol	. 41	11	11		10.0	ND	D	
Dimethyl phthalate	n		**		10.0	ND	**	
4.6-Dinitro-2-methylphenol	n	**	ıı		10.0	ND	11	
2.4-Dinitrophenol	н		••		10.0	ND	н	
2.4-Dinitrotoluene	н	11	**		10.0	ND	u .	

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Project:

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Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Seattle, WA 98101

Project Number: Project Manager:

10022-03 Carlotta Cellucci

Reported:

9/28/98 17:46

# Semivolatile Organic Compounds by EPA Method 8270C North Creek Analytical - Bothell

	Batch	Date	Date	Surrogate	Reporting			
Analyte	Number	Prepared	Analyzed	Limits	Limit	Result	Units	Notes*
090198-BIL-MW5-GW-01 (continued)			B8090	89-04			<u>Water</u>	
2.6-Dinitrotoluene	0980182	9/5/98	9/14/98	<del></del>	10.0	ND	ug/l	
Di-n-octyl phthalate	11	н	"		5.00	ND	"	
Fluoranthene	**	10	•		5.00	ND	**	
F!uorene		10	**		10.0	ND	•	
Hexachlorobenzene	, ,	n n	••		10.0	ND	••	
Hexachlorobutadiene	p	H	<i>11</i>		5.00	ND	,,	
Hexachlorocyclopentadiene	•	"	n		5.00	ND		
Hexachloroethane	rt	••	11		10.0	ND	H	
Indeno (1.2.3-cd) pyrene	**	н	**		5.00	ND	H	
Isophorone	**	11	n		10.0	ND	**	
2-Methylnaphthalene	н	"	**		10.0	ND	"	
2-Methylphenol	**	**	n,		10.0	ND	,,	
3 & 4-Methylphenol	u .	**	n n		10.0	ND	**	
aphthalene	n	"	n		10.0	ND	11	
2-Nitroaniline	п	"	**		20.0	ND	••	_
3-Nitroaniline	"	**	**		10.0	ND	**	
4-Nitroaniline	n	**	**		10.0	ND		
Nitrobenzene	"	,,	н		10.0	ND	"	
2-Nitrophenol	··	ti	11		5.00	ND	"	•
4-Nitrophenol	11	**	••		10.0	ND	••	
N-Nitrosodiphenylamine	11	**	•		10.0	ND	"	
N-Nitrosodi-n-propylamine	**	••	и		10.0	ND	n	
Pentachlorophenol	**	n	**		10.0	ND		
Phenanthrene	"	D	·		10.0	ND		
Phenol	**	•	u		10.0	ND		
Pyrene	n .		н		5.00	ND		
1.2.4-Trichlorobenzene	**	**			5.00	ND		
2.4.5-Trichlorophenol	"	**	**		10.0	ND	••	
2.4.6-Trichlorophenol	19	U	"		10.0	ND	tr	
Surrogate: 2-FP	,,	"·	,	40.0-115		54.7	%	
Surrogate: Phenol-d6	"	"	"	18.0-145		62.5	"	
Surrogate: 2,4.6-TBP	"	"	"	24.0-130		89.0	"	
Surrogate: Nitrobenzene-d5	"	n .	"	42.0-110		59.5	"	
Surrogate: 2-FBP	"	"	"	46.0-116		71.0	"	
Surrogate: p-Terphenyl-d14	"	"	"	63.0-117		86.2	"	

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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

9/3/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

# Conventional Chemistry Parameters by APHA/EPA Methods North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Notes*
090198-BIL-MW3-GW-01			B80908			·	Water	
Cyanide (total)	0980401	9/10/98	9/10/98	EPA 335.2	0.0100	ND	mg/l	
090198-BIL-MW4-GW-01 Cyanide (total)	0980401	9/10/98	<u>B8090</u> 8 9/10/98	89-02 EPA 335.2	0.0100	ND	<u>Water</u> mg/l	
090298-BIL-MW2-GW-01 Cyanide (total)	0980401	9/10/98	<b><u>B8090</u></b> 9/10/98	89-03 EPA 335.2	0.0100	ND	Water mg/l	
090198-BIL-MW5-GW-01 Cyanide (total)	0980401	9/10/98	<b><u>B8090</u></b> 8	<b>89-04</b> EPA 335.2	0.0100	ND	<u>Water</u> mg/l	

North Creek Analytical - Bothell





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Sampled: 9/1/98 to 9/2/98

Tetra Tech, Inc. 600 University St., Suite 800

Project: Br Project Number: 10

10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Ca

Carlotta Cellucci

Bradford Island Landfill

Reported: 9/28/98 17:46

# Hydrocarbon Identification by Washington DOE Method NWTPH-HCID/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	KPD	KPD		
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u>	Limit	% Notes*		
Batch: 0980181	Date Prepared: 9/5/98				Extraction Method: EPA 3520C/600 Series						
<u>Blank</u>	<u>0980181-BI</u>	<u> KI</u>									
Gx Range Hydrocarbons	9/8/98			ND	mg/l	0.250					
Kerosene Range Hydrocarbons	"			ND	n	0.630					
Diesel Range Hydrocarbons	"			ND	11	0.630					
Insulating Oil Range Hydrocarbons	**			ND	"	0.630					
Heavy Fuel Oil Range Hydrocarbons	**			ND	"	0.630					
Lube Oil Range Hydrocarbons	R			ND	н	0.630					
Surrogate. 2-FBP	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	DET		DET	"	50.0-150	83.9				

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Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

10022-03 Project Number:

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

#### Volatile Petroleum Products by NWTPH-Gx/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Batch: 0980148	Date Prepa	red: 9/4/98	3		Extra	ction Method: EP	A 5030B	(P/T)		
<u>Blank</u>	0980148-B	<u>LK1</u>								
Gasoline Range Hydrocarbons	9/4/98			ND	ug/l	50.0				
Surrogate: 4-BFB (FID)	,,	48.0		60.3	"	50.0-150	126			
LCS	0980148-B	<u>S1</u>								
Gasoline Range Hydrocarbons	9/4/98	500		526	ug/l	70.0-130	105			
Surrogate: 4-BFB (FID)		48.0		71.7	"	50.0-150	149		-	
<u>Duplicate</u>	0980148-D	<u>UP1 B8</u>	<u>809091-03</u>							
Gasoline Range Hydrocarbons	9/4/98		ND	ND	ug/l			25.0		
Surrogate: 4-BFB (FID)	"	48.0		60.6	"	50.0-150	126		**	

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and define

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 Eas: 11115 Montgomery Suite B. Spokane, WA 99206-4776 9405 S W. Nimbus Avenue, Beaverton, OR 97008-7132



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Project: Bradford Island Landfill

Project Number: 10022-03

9/1/98 to 9/2/98 Sampled: Received: 9/3/98

Seattle, WA 98101

600 University St., Suite 800

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	<u>%</u>	Limit	%	Notes
Batch: 0980181	Date Prep	ared: 9/5/98	8		<u>Extra</u>	ction Method: EP	A 3520C	<u>/600 Seri</u>	<u>es</u>	
<u>Blank</u>	<u>0980181-E</u>	<u>lki</u>								
Diesel Range Hydrocarbons	9/8/98			ND	mg/l	0.250				
Lube Oil Range Hydrocarbons	"			ND	**	0.500				
Surrogate: 2-FBP	n	0.329		0.276	"	50.0-150	83.9			
LCS	0980181-E	<u>IS1</u>								
Diesel Range Hydrocarbons	9/8/98	2.00		2.04	mg/l	60.0-140	102			
Surrogate: 2-FBP	<u>"</u>	0.329		0.302	"	50.0-150	91.8			
LCS Dup	0980181-B	SD1								
Diesel Range Hydrocarbons	9/8/98	2.00		1.63	mg/l	60.0-140	81.5	40.0	22.3	
Surrogate: 2-FBP	,	0.329		0.249	"	50.0-150	75.7			-

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\*Refer to end of report for text of notes and definitions.





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Project: Project Number:

Bradford Island Landfill

10022-03

Project Manager: Carlotta Cellucci

Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Reported: 9/28/98 17:46

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Batch: 0980333	<u>Date Prepa</u>	red: 9/10/9	98		Extract	tion Method: EP	A 3020A			
Blank	0980333-BI		<u>20</u>		DATIBLE	non weenog. Er	ZE DOBOZE			
Antimony	9/11/98	<u> </u>		ND	mg/l	0.00100				
Arsenic	"			ND	"	0.00100				
Barium	n			ND	**	0.0100				
Beryllium	n			ND	**	0.00100				
Cadmium	II.			ND	n	0.00100				
Chromium	и			ND	н	0.00100				
Cobalt	11			ND	0	0.00100				
Copper	ij			ND		0.00100				
Lead	ii .			ND	11	0.00100				
Manganese	н			ND	11	0.00100				
Nickel	"			ND	**	0.00100				
Selenium	n			ND	**	0.00100				,
Silver	**			ND	. 11	0.00100				(
Thallium	"			ND	н	0.00100				<b>A</b>
Vanadium	"			ND	"	0.00100				
Zinc	D			ND	"	0.0100				
<u>LCS</u>	0980333-BS	<u> </u>								
Antimony	9/11/98	0.200		0.194	mg/l	80.0-120	97.0			
Arsenic	"	0.200		0.198	"	80.0-120	99.0			
Barium	"	0.200		0.202	"	80.0-120	101			
Beryllium		0.200		0.203	"	80.0-120	101			
Cadmium	n	0.200		0.194	U	80.0-120	97.0			
Chromium	"	0.200		0.192		80.0-120	96.0			
Cobalt	n	0.200		0.198	"	80.0-120	99.0			
Copper		0.200		0.199	**	80.0-120	99.5			
Lead	"	0.200		0.200	н	80.0-120	100			
Manganese	11	0.200		0.201	**	80.0-120	101			
Nickel	0	0.200		0.187	н	80.0-120	93.5			
Selenium	n	0.200		0.196	11	80.0-120	98.0			
Silver	**	0.200		0.191	н	80.0-120	95.5		•	
Fhallium	· ·	0.200		0.203	n	80.0-120				
√anadium	. 19	0.200		0.197	"	80.0-120				
Zinc	11	0.200		0.194	11	80.0-120	97.0			
<u>Duplicate</u>	0980333-DI	<u>UP1 B</u>	809089-01							
Antimony	9/11/98		ND	ND	mg/l			20.0		
					-					1

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang Project Manage



PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit		RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Duplicate (continued)	<u>0980333-D</u>	I i P 1	B809089-01							
Arsenic	9/11/98	<u> </u>	ND	ND	mg/l			20.0		
Barium	"		0.0233	0.0259	"			20.0	10.6	
Beryllium	rt .		ND	ND	н			20.0		
Cadmium	н		ND	ND	**			20.0		
Chromium	н .		0.00111	0.00112	"			20.0	0.897	
Cobalt	· 0		ND	ND	,,			20.0		
Copper	ti		0.00185	0.00195	**			20.0	5.26	
Lead	11		ND	0.00104	"			20.0		2
Manganese	11		0.348	0.358	H			20.0	2.83	
Nickel	II.		0.00247	0.00255	н			20.0	3.19	
Selenium	11		ND	ND	**			20.0		
Silver	n		ND	ND	*			20.0		
Thallium	"		ND	ND	59			20.0		
anadium	u		ND	ND	**			20.0		
Zinc	и		ND	ND	"			20.0		
Matrix Spike	0980333-M	S1	B809089-01							
Antimony	9/11/98	0.200	ND	0.189	mg/l	75.0-125	94.5			
Arsenic	"	0.200	ND	0.197	1115/1	75.0-125	98.5			
Barium	er e	0.200	0.0233	0.218	11	75.0-125	97.3			
Beryllium	**	0.200	ND	0.192	**	75.0-125	96.0			
Cadmium	11	0.200	ND	0.189	**	75.0-125	94.5			
Chromium	"	0.200	0.00111	0.137	,,	75.0-125	87.9		•	
Cobalt	п	0.200	ND	0.177	**	75.0-125	90.5			
Copper	11	0.200	0.00185	0.194	.,	75.0-125	96.1			
Lead	н	0.200	ND	0.197	11	75.0-125	98.5			
Manganese	9/12/98	0.200	0.348	0.550	н	75.0-125	101			
Nickel	9/11/98	0.200	0.00247	0.169	н	75.0-125	83.3			
Selenium	"	0.200	0.00247 ND	0.192	"	75.0-125	96.0			
Silver	n .	0.200	ND	0.172	•	75.0-125	89.5			
Thallium	**	0.200	ND	0.201	"	75.0-125	101			
Vanadium		0.200	ND	0.201	11	75.0-125	93.5			
Zinc	и	0.200	ND ND	0.187	n	75.0-125	96.0			
Batch: 0980414	<u>Date Prepa</u>	rod: 0/14	/08		Cutuc	tion Method: EP.	A 2020 A			
Blank	<u>0980414-BI</u>		<u>u 70</u>		EXITAC	tion Method: EP	A JUZUA			
Mercury Mercury	<u>0980414-61</u> 9/15/98	<u> </u>		ND	m = /1	0.00100				
Mercury	7/13/98			ND	mg/l	0.00100				

orth Creek Analytical - Bothell

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Joy B Chang. Project Manage



PORTLAND • (503) 906-9200 • FAX 906-921

Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Received: 9/3/98

Seattle, WA 98101

Project Number: 10022-03 Project Manager:

Carlotta Cellucci

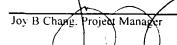
Reported: 9/28/98 17:46

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit		Notes*
LCS	<u>0980414-BS</u>									
Mercury	9/15/98	0.00500		0.00513	mg/l	70.0-130	103			
Matrix Spike	0980414-MS	<u>81 B8</u>	<u>809089-02</u>							
Mercury	9/15/98	0.00500	ND	0.00541	mg/l	75.0-125	108			
Matrix Spike Dup	0980414-MS	<u>SD1 B8</u>	<u>809089-02</u>							
Mercury	9/15/98	0.00500	ND	0.00537	mg/l	75.0-125	107	20.0	0.930	
Batch: 0980533	<u>Date Prepar</u>	ed: 9/23/9	<u>98</u>		Extrac	tion Method: EP	<u>A 3020A</u>			
<u>Blank</u>	<u>0980533-BL</u>	<u>.K1</u>								
Aluminum	9/24/98			ND	mg/l	0.0500				
<u>LC\$</u>	0980533-BS	<u>1</u>								
Aluminum	. 9/25/98	1.00		1.18	mg/l	80.0-120	118			
<u>Duplicate</u>	<u>0980533-DU</u>	<u> P1 B8</u>	309089 <u>-01</u>							
Aluminum	9/24/98		0.107	0.112	mg/l			20.0	4.57	
Matrix Spike	<u>0980533-MS</u>	<u>81</u> <u>B</u> 8	<u> 309089-01</u>							
Aluminum	9/24/98	1.00 .	0.107	1.16	mg/l	75.0-125	105			
Batch: 0980557	<u>Date Prepar</u>	ed: 9/17/9	<u>98</u>		Extrac	tion Method: EP	<u>A 3010A</u>			
<u>Blank</u>	<u>0980557-BL</u>	<u>K1</u>								
Calcium	9/22/98			0.446	mg/l	0.250				3
Iron	н			ND	"	0.150				
Magnesium	"			ND	11	0.100				
Potassium	"			ND	11	0.200			•	
Sodium	"			ND	"	0.500				
<u>LCS</u>	0980557-BS	<u>1</u>								
Calcium	9/22/98	1.00		1.29	mg/l	80.0-120	129			3.6
Iron	n	1.00		1.01	"	80.0-120	101			
Magnesium	n	1.00		0.896	*	80.0-120	89.6			
Potassium	n	10.0		9.50	**	80.0-120	95.0			
Sodium	"	1.00		0.990	11	80.0-120	99.0			
Matrix Spike	<u>0980557-MS</u>	<u> </u>	809089-04							
Calcium	9/22/98	1.00	72.9	73.8	mg/l	80.0-120	90.0			

North Creek Analytical - Bothell

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Tetra Tech, Inc.

600 University St., Suite 800

Seattle, WA 98101

Bradford Island Landfill Project:

10022-03 Project Number:

Project Manager: Carlotta Cellucci Sampled:

9/1/98 to 9/2/98

9/3/98 Received: 9/28/98 17:46 Reported:

#### Total Metals by EPA 6000/7000 Series Methods/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Matrix Spike (continued)	0980557-MS	51 <u>B</u>	809089-04							
Iron	9/22/98	1.00	8.88	10.1	mg/l	80.0-120	122			4
Magnesium	ii .	1.00	16.7	17.9	"	80.0-120	120			
Potassium	O	10.0	4.91	14.2	н	80.0-120	92.9			
Sodium	n	1.00	10.3	11.3	"	80.0-120	100			
Matrix Spike Dup	0980557-MS	<u>D1 B</u>	809089-04				٠			
Calcium	9/22/98	1.00	72.9	72.5	mg/l	80.0-120	NR	20.0	NR	4
Iron	n	1.00	8.88	10.1	"	80.0-120	122	20.0	0	4
Magnesium	*1	1.00	16.7	17.7	"	80.0-120	100	20.0	18.2	
Potassium		10.0	4.91	14.3	"	80.0-120	93.9	20.0	1.07	
Sodium	**	1.00	10.3	11.2		80.0-120	90.0	20.0	10.5	

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Joy B Chang. Project Manager



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number:

10022-03

9/3/98 Received: 9/28/98 17:46 Reported:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

#### Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit Re	ecov.	RPD	RPD
Analyte .	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0980180	Date Prepa				<u>Extra</u>	ction Method: EPA 3	3520C/	<u>600 Seri</u>	<u>es</u>
Blank	0980180-B	<u>LK1</u>							
Aldrin	9/24/98			ND	ug/l	0.0400			
alpha-BHC	"			ND	"	0.0200			
beta-BHC	•			ND		0.0300			
delta-BHC	"			ND	"	0.0200			
gamma-BHC (Lindane)	"			ND	"	0.0300			
Chlordane (tech)	"			ND	"	0.150			
alpha-Chlordane	"			ND	"	0.0200			
gamma-Chlordane	"			ND	"	0.0200			
4.4'-DDD	"			ND	"	0.0400			
4.4´-DDE				ND	11	0.0300			
4.4´-DDT	11			ND	10	0.0900			
Dieldrin	**			ND	н	0.0700			
Endosulfan I	**			ND	**	0.0300			(
Endosulfan II	**			ND	**	0.0500			<u> </u>
Endosulfan sulfate	**			ND	"	0.0700			
Endrin				ND	••	0.0800			
Endrin aldehyde	*1			ND	**	0.0800			
Heptachlor	**			ND	"	0.0300			
Heptachlor epoxide	*1			ND	н	0.0300			
Methoxychlor	**			ND	**	0.500			
Гохарhene	"			ND	**	1.50			
Aroclor 1016	н			ND ·	•	0.100			
Aroclor 1221	n			ND	**	0.100			
Aroclor 1232				ND		0.100			
Aroclor 1242				ND	n	0.100			
Aroclor 1248	••			ND	"	0.100			
Aroclor 1254	•			ND	**	0.100			
Aroclor 1260	•			ND	**	0.100			
Aroclor 1262	••			ND	11	0.100			
Aroclor 1268	••			ND	н	0.100			
Surrogate: TCV	"	0.200		0.161			80.5		
LCS	0980180-BS	S1							
Aldrin	9/24/98	0.250		0.235	ug/l	45.0-143	94.0		
gamma-BHC (Lindane)	"	0.250		0.202	ug.	45.0-147	80.8		
leptachlor	11	0.250		0.108	11	37.0-156	43.2		
Aroclor 1260	10	10.0		6.25		33.0-122	62.5		
		• • • •		0.23		33.0 .22	J <b>2</b> .J		

North Creek Analytical - Bothell

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Joy B Chang, Project Manager

13939 120th Avenue N E , Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



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Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

## Organochlorine Pesticides and PCBs by EPA Method 8081A and 8082/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
LCS (continued)	0980180-BS	<u>31</u>								
Surrogate: TCX	9/24/98	0.200		0.161	ug/l	40.0-130	80.5			
LCS Dup	<u>0980180-BS</u>	<u>SD1</u>								
Aldrin	9/24/98	0.250		0.248	ug/l	45.0-143	99.2	36.0	5.38	
gamma-BHC (Lindane)	"	0.250		0.214	н	45.0-147	85.6	25.0	5.77	
Heptachlor		0.250		0.118	**	37.0-156	47.2	37.0	8.85	
Aroclor 1260	"	10.0		6.74	,,	33.0-122	67.4	21.0	7.54	
Surrogate: TCX	<del>"</del>	0.200		0.165	"	40.0-130	82.5			
Matrix Spike	<u>0980180-M</u>	<u>S1 B</u>	809108-03							
Aldrin	9/24/98	0.472	ND	0.111	ug/l	45.0-143	23.5			5
gamma-BHC (Lindane)	n	0.472	ND	0.440	n	45.0-147	93.2			
Heptachlor	**	0.472	ND	0.191	H	37.0-156	40.5			
roclor 1260	11	18.9	ND	14.5	**	33.0-122	76.7			
Surrogate: TCX	"	0.377		0.317	"	40.0-130	84.1		•	
Matrix Spike Dup	0980180-M	SDI B	809108-03							
Aldrin	9/24/98	0.472	ND	0.184	ug/l	45.0-143	39.0	36.0	49.6	5
gamma-BHC (Lindane)	ri	0.472	ND	0.424	"	45.0-147	89.8	25.0	3.72	
Heptachlor		0.472	ND	0.165	**	37.0-156	35.0	37.0	14.6	5
Aroclor 1260	v	18.9	ND	14.1	.,	33.0-122	74.6	21.0	2.78	
Surrogate: TCX	"	0.377		0.335	"	40.0-130	88.9			

orth Creek Analytical - Bothell

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Joy B Chang Project Manager



PORTLAND = (503) 906-9200 = FAX 906-921(

Tetra Tech. Inc.

600 University St., Suite 800

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Seattle, WA 98101

10022-03 Project Number:

9/3/98 Received:

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Chlorinated Herbicides by EPA Method 8151A/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0980213	Date Prepa	red: 9/8/98	<u>8</u>		Extrac	tion Method: EPA	1658		
<u>Blank</u>	0980213-B	LK1							
2.4-D	9/21/98			ND	ug/l	0.500			
2.4-DB	•			ND	*	1.00			
2.4.5-T	•			ND	•	1.00			
2.4.5-TP (Silvex)	u			ND	11	1.00			
Dalapon				ND	"	1.50			
Dicamba				ND	**	0.500			
Dichlorprop	"			ND	"	1.00			
Dinoseb	***			ND	"	1.00			
MCPA	11			ND	**	50.0			
MCPP	**			ND	11	50.0			
Surrogate: 2.4-DCAA	,, -	11.1		3.40	,,	24.0-135	30.6		
LCS	0980213-B	<u>S1</u>							
2.4-D	9/21/98	3.33		2.59	ug/l	34.0-136	77.8		
2.4.5-TP (Silvex)	**	3.33		2.54	"	34.0-123	76.3		
Surrogate: 2.4-DCAA	"	$II.\dot{I}$		3.37	,,	24.0-135	30.4	• •	. =
Matrix Spike	0980213-M	IS1 B	<u>809089-03</u>						
2.4-D	9/21/98	6.67	ND	5.24	ug/l	34.0-136	78.6		
2.4.5-TP (Silvex)	"	6.67	ND	5.28	"	34.0-123	79.2		
Surrogate: 2.4-DCAA	"	22.2	* **	14.3	,	24.0-135	64.4		•
Matrix Spike Dup	<u>0980213-M</u>	SD1 B	<u>809089-03</u>						
2.4-D	9/21/98	6.67	ND	4.97	ug/l	34.0-136	74.5	46.0	5.36
2.4.5-TP (Silvex)	11	6.67	ND	5.50	"	34.0-123	82.5	41.0	4.08
Surrogate: 2.4-DCAA	"	22.2		16.4	"	24.0-135	73.9		

North Creek Analytical - Bothell

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Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Seattle, WA 98101

10022-03 Project Number: Project Manager:

Carlotta Cellucci

Received: 9/3/98 Reported: 9/28/98 17:46

#### Volatile Organic Compounds by EPA Method 8260B/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte .	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
				·						
Batch: 0980188	Date Prepa		<u>8</u>		Extract	tion Method: EPA	4 5030B	[P/T]		
<u>Blank</u>	<u>0980188-BI</u>	<u>LKI</u>								
Acetone	9/5/98			ND	ug/l	10.0				
Benzene	11			ND		1.00				
Bromobenzene	**			ND	**	1.00				
Bromochloromethane	и.			ND	H	1.00				
Bromodichloromethane	0			ND	0	1.00				
Bromoform	n .			ND	11	1.00				
Bromomethane	0			ND	**	1.00				
2-Butanone	**			ND		10.0				
n-Butylbenzene	"			ND	н	1.00				
sec-Butylbenzene	n			ND	11	1.00				
tert-Butylbenzene	"			ND	11	1.00				
Carbon disulfide	"			ND	18	1.00				
arbon tetrachloride	**			ND	**	1.00				
Chlorobenzene	18			ND	11	1.00				
Chloroethane	**			ND	**	1.00				
Chloroform	10			ND		1.00				
Chloromethane	**			ND	H	5.00				
2-Chlorotoluene				ND	**	1.00				
4-Chlorotoluene	**			ND		1.00				
Dibromochloromethane	R			ND	n	1.00				
1.2-Dibromo-3-chloropropane	11			ND	"	5.00				
1.2-Dibromoethane	14			ND	••	1.00				
Dibromomethane	"			ND	11	1.00				
1.2-Dichlorobenzene	**			ND	**	1.00				
1.3-Dichlorobenzene	••			ND	**	1.00				
1.4-Dichlorobenzene	"	•		ND	**	1.00				
Dichlorodifluoromethane	••			ND	**	1.00				
1.1-Dichloroethane	o			ND	н	1.00				
1.2-Dichloroethane	**			ND	**	1.00				
1.1-Dichloroethene				ND	<b>\$</b> 1	1.00				
cis-1.2-Dichloroethene	u			ND	**	1.00				
trans-1,2-Dichloroethene	**			ND	"	1.00				
1.2-Dichloropropane	н			ND	11	1.00				
1.3-Dichloropropane	н			ND		1.00				
2.2-Dichloropropane	n			ND	**	1.00				
1.1-Dichloropropene	,			ND	II.	1.00				
cis-1,3-Dichloropropene	**			ND		1.00				
em au-mentapropene				112						

orth Creek Analytical - Bothell



<sup>\*</sup>Refer to end of report for text of notes and definitions.



PORTLAND • (503) 906-9200 • FAX 906-921/

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number:

10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager:

Carlotta Cellucci

9/28/98 17:46 Reported:

#### Volatile Organic Compounds by EPA Method 8260B/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
Blank (continued)	0980188-B	<u>LK1</u>								
trans-1.3-Dichloropropene	9/5/98			ND	ug/l	1.00				
Ethylbenzene	**			ND	"	1.00				
Hexachlorobutadiene	**			ND	"	1.00				
2-Hexanone	**			ND	"	10.0				
lsopropylbenzene	**			ND	"	1.00				
p-lsopropyltoluene	**			ND	н	1.00				
Methylene chloride	п			5.07		5.00				1
4-Methyl-2-pentanone	er e			ND	**	10.0				
Naphthalene	•			ND	**	1.00				
n-Propylbenzene	**			ND	71	1.00				
Styrene	и			ND	17	1.00				
1.1.1.2-Tetrachloroethane	и			ND	19	1.00				
1.1.2.2-Tetrachloroethane	H			ND		1.00				
Tetrachloroethene	**			ND	**	1.00				
Toluene	**			ND	"	1.00				
1.2.3-Trichlorobenzene				ND	10	1.00				
1.2.4-Trichlorobenzene				ND	••	1.00				
1.1.1-Trichloroethane	u.			ND		1.00				
1.1.2-Trichloroethane	"			ND	••	1.00				
Trichloroethene	n			ND	11	1.00				
Trichlorofluoromethane	**			ND	11	1.00				
1.2.3-Trichloropropane	"			ND		1.00				
1.2.4-Trimethylbenzene	**			ND	**	1.00				
1.3.5-Trimethylbenzene				ND	**	1.00				
Vinyl chloride	.,			ND	"	1.00				
m.p-Xylene	**			ND	"	2.00				
o-Xylene				ND	**	1.00				
Surrogate 2-Bromopropene	,,	20.0		20.1	·····	80.0-120	101			
Surrogate: 1.2-DCA-d4	,,	20.0		23.1	"	80.0-120	116			
Surrogate: Toluene-d8	"	20.0		19.0	,,	80.0-120	95.0			
Surrogate, 4-BFB	"	20.0		19.7	"	80.0-120	98.5			
LCS	0980188-B	<u>81</u>								
Benzene	9/5/98	10.0		8.19	ug/l	80.0-120	81.9			
Chlorobenzene		10.0		8.70	"	80.0-120	87.0			
1.1-Dichloroethene	11	10.0		8.09	н	80.0-120	80.9			
Toluene	**	10.0		10.3	**	80.0-120	103			
Trichloroethene	**	10.0		8.59	11	80.0-120	85.9			

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defir





PORTLAND • (503) 906-9200 • FAX 906-9210

Tetra Tech. Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Volatile Organic Compounds by EPA Method 8260B/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	%	Notes*
LCS (continued)	0980188-BS	1								
Surrogate: 2-Bromopropene	9/5/98	20.0		19.3	ug/l	80.0-120	96.5	_		
Surrogate: 1,2-DCA-d4	"	20.0		22.1	"	80.0-120	111			
Surrogate: Toluene-d8	"	20.0		19.0	"	80.0-120	95.0			
Surrogate: 4-BFB	"	20.0		19.5	"	80.0-120	97.5			
Matrix Spike	<u>0980188-MS</u>	S1 B	809089 <u>-01</u>							
Benzene	9/5/98	10.0	ND	8.10	ug/l	80.0-120	81.0			
Chlorobenzene	e e	10.0	ND	8.60	"	80.0-120	86.0			
1.1-Dichloroethene	11	0.01	ND	7.43	"	80.0-120	74.3			5
Toluene	"	10.0	ND	8.71	•	80.0-120	87.1			
Trichloroethene	· .	10.0	ND	8.46	*1	80.0-120	84.6			
Surrogate: 2-Bromopropene	"	20.0		18.7	,,	80.0-120	93.5			
Surrogate. 1,2-DCA-d4	"	20.0		21.7	"	80.0-120	109			
urrogate: Toluene-d8	"	20.0		19.0	"	80.0-120	95.0			
Surrogate: 4-BFB	"	20.0		19.9	"	80.0-120	99.5			
Matrix Spike Dup	0980188-MS	<u>SD1 B</u>	809089-01							
Benzene	9/5/98	10.0	ND	7.98	ug/l	80.0-120	79.8	15.0	1.49	5
Chlorobenzene	11	10.0	ND	8.57		80.0-120	85.7	15.0	0.349	
1.1-Dichloroethene	**	10.0	ND	7.28	**	80.0-120	72.8	15.0	2.04	. 5
Toluene	ti .	10.0	ND	9.89	**	80.0-120	98.9	15.0	12.7	
Trichloroethene	"	10.0	ND	8.58		80.0-120	85.8	15.0	1.41	
Surrogate: 2-Bromopropene	n .	20.0		19.1	,,	80.0-120	95.5			
Surrogate: 1,2-DCA-d4	"	20.0		21.6	"	80.0-120	108			
Surrogate: Toluene-d8	"	20.0		19.0	"	80.0-120	95.0			
Surrogate: 4-BFB	"	20.0		19.5	"	80.0-120	97.5			

orth Creek Analytical - Bothell

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Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800 Seattle, WA 98101

Project Number: 10022-03

9/3/98 Received:

Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit Reco	v. RPD	RPD
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	% Limit	% Notes*
Batch: 0980182	Doto Duc	d. 0/E/09			F4	tion Mothad: ED4 757	0 <i>C/</i> 600 S	ios
Blank	<u>Date Prepa</u> 0980182-BI		2		LXITAC	tion Method: EPA 352	UC/OUU SEF	<u>162</u>
Acenaphthene	9/13/98	<u> </u>		ND	ug/l	10.0		
Acenaphthylene	9/13/70 "			ND	ug/1	10.0		
Aniline	0			ND	**	10.0		
Anthracene	**			ND	**	10.0		
Benzoic Acid	**			ND ND	"	20.0		
Benzo (a) anthracene	**			ND ND	"	5.00		
Benzo (b) fluoranthene	п			ND	"	5.00		
Benzo (k) fluoranthene	ıt			ND	**	5.00		
Benzo (ghi) perylene	11			ND	"	5.00		
Benzo (a) pyrene	"			ND	**	5.00		
Benzyl alcohol				ND	**	10.0		
Bis(2-chloroethoxy)methane	11			ND ND	"	10.0		
Bis(2-chloroethyl)ether	"			ND ND	.,	10.0		
Bis(2-chloroisopropyl)ether	**			ND ND	**	10.0		
Bis(2-ethylhexyl)phthalate	**			ND ND	**	20.0		
4-Bromophenyl phenyl ether	**			ND ND	**	10.0		
Butyl benzyl phthalate				ND ND	*1	5.00		
Carbazole	,,			ND ND	**	10.0		
4-Chloroaniline				ND ND	11	5.00		
2-Chloronaphthalene		•		ND ND	н	10.0		
4-Chloro-3-methylphenol	••			ND	"	10.0		
2-Chlorophenol	11			ND ND	11	10.0		
4-Chlorophenyl phenyl ether				ND	,,	10.0		
Chrysene				ND ND	"	5.00		
Dibenz (a.h) anthracene	,,			ND ND		5.00		
Dibenzofuran				ND	н	10.0		
Di-n-butyl phthalate	"		-	ND ND	**	5.00		
1.3-Dichlorobenzene	п			ND	"	5.00		
1.4-Dichlorobenzene	11			ND ND	н	5.00		
1.2-Dichlorobenzene	"			ND ND	**	5.00		
3.3'-Dichlorobenzidine	"				11			
2.4-Dichlorophenol	11			ND ND	,,	20.0 10.0		
Diethyl phthalate					••			
2.4-Dimethylphenol				ND ND	**	10.0 10.0		
Dimethyl phthalate	**			ND ND				
4.6-Dinitro-2-methylphenol	"			ND ND		10.0		
2.4-Dinitrophenol				ND ND	**	10.0		
2.4-Dimophenoi				ND		10.0		

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defi





BOTHELL • (425) 420-9200 • FAX 420-9210 SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND • (503) 906-9200 • FAX 906-9210

Sampled: 9/1/98 to 9/2/98 Received: 9/3/98

Reported: 9/28/98 17:46

Tetra Tech, Inc. 600 University St., Suite 800 Seattle, WA 98101 Project: Bradford Project Number: 10022-03

Project Manager: Carlotta Cellucci

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

Bradford Island Landfill

	Date	Spike	Sample	QC		Reporting Limit		RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	<u>%</u>	Notes*
Blank (continued)	<u>0980182-BL</u>	.K1								
2.4-Dinitrotoluene	9/13/98			ND	ug/l	10.0				
2.6-Dinitrotoluene	"			ND	"	10.0				
Di-n-octyl phthalate	п			ND	11	5.00				
Fluoranthene	"			ND	••	5.00				
Fluorene	н			ND	*1	10.0				
Hexachlorobenzene	11			ND	**	10.0				
Hexachlorobutadiene	"			ND	**	5.00				
Hexachlorocyclopentadiene				ND	**	5.00				
Hexachloroethane	и			ND	**	10.0				
Indeno (1.2.3-cd) pyrene	"			ND	n	5.00				
Isophorone	и			ND	11	10.0				
2-Methylnaphthalene	11			ND	**	10.0				
2-Methylphenol	11			ND	**	10.0				
& 4-Methylphenol	"			ND	и	10.0				
Naphthalene	10			ND	**	10.0				
2-Nitroaniline	•			ND		20.0				
3-Nitroaniline	. "			ND	11	10.0				
4-Nitroaniline				ND	**	10.0				
Nitrobenzene				ND	0	10.0				
2-Nitrophenol				ND	"	5.00				
4-Nitrophenol	**	•		ND	"	10.0				
N-Nitrosodiphenylamine	п			ND	11	10.0				
N-Nitrosodi-n-propylamine				ND	**	10.0				
Pentachlorophenol				ND	•	10.0				
Phenanthrene	•			ND	**	10.0				
Phenol				ND	**	10.0				
Pyrene	41			ND	**	5.00				
1.2.4-Trichlorobenzene	**			ND	"	5.00				
2.4.5-Trichlorophenol	н			ND		10.0				
2.4.6-Trichlorophenol	· ·			ND	"	10.0				
Surrogate: 2-FP	"	50.0		32.5		40.0-115	65.0			
Surrogate: 2-FV Surrogate: Phenol-d6	"	50.0		32.5 37.9	,,	18.0-145	75.8			
Surrogate. 2.4.6-TBP	"	50.0		37.9 38.9	"	24.0-130	77.8			
Surrogate: Nitrobenzene-d5	,,	50.0 50.0		38.9 40.9	,,	42.0-110	81.8			
Surrogate: Surobenzene-as Surrogate: 2-FBP	"	50.0 50.0		40.9 46.8	"	46.0-116	93.6			
•	"	50.0 50.0		40.6 47.1	,,	63.0-117	93.0 94.2			
Surrogate: p-Terphenyl-d14		50,0		<b>→</b> / . I		05.17-117	74.4			

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.





PORTLAND = (503) 906-9200 = FAX 906-921

Tetra Tech. Inc.

600 University St., Suite 800

Project:

Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

Seattle, WA 98101

Project Number: 10 Project Manager: Ca

10022-03 Carlotta Cellucci Received: 9/3/98 Reported: 9/28/98 17:46

Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	0,0	Notes*
LCS	0980182-BS	1								
Acenaphthene	9/13/98	100		77.6	ug/l	42.0-110	77.6			
4-Chloro-3-methylphenol	11	200		150	"	35.0-110	75.0			
2-Chlorophenol	n.	200		146	**	45.0-110	73.0			
1.4-Dichlorobenzene	**	100		83.0	**	23.0-110	83.0			
2.4-Dinitrotoluene	u	100		78.3	**	51.0-110	78.3			
4-Nitrophenol	· ·	200		138	n	16.0-110	69.0			
N-Nitrosodi-n-propylamine	η	100		77.3	**	34.0-115	77.3			
Pentachlorophenol	n	200		122	**	30.0-124	61.0			
Phenol	"	200		153	11	39.0-110	76.5			
Pyrene	u .	100		83.7	**	49.0-113	83.7			
1.2.4-Trichlorobenzene	n	100		80.0	**	17.0-110	80.0			
Surrogate. 2-FP	"	50.0		33.8	,	40.0-115	67.6			
Surrogate: Phenol-d6	"	50.0		40.0	"	18.0-145	80.0			
Surrogate: 2,4,6-TBP	"	50.0		42.2	"	24.0-130	84.4			(
Surrogate: Nitrobenzene-d5	"	50.0		38.1	,,	42.0-110	76.2			
Surrogate 2-FBP	"	50.0		44.9	"	46.0-116	89.8			
Surrogate: p-Terphenyl-d14	"	50.0		43.1	"	63,0-117	86.2			
Matrix Spike	<u>0980182-MS</u>	1 B	309089-04							
Acenaphthene	9/14/98	235	ND	185	ug/l	48.0-110	78.7			
4-Chloro-3-methylphenol	u .	471	ND	368	,,	45.0-110	78.1			
2-Chlorophenol	**	471	ND	322	n n	39.0-110	68.4			
1.4-Dichlorobenzene	**	235	ND	185	21	27.0-110	78.7			
2.4-Dinitrotoluene	"	235	ND	213	**	60.0-110	90.6			
4-Nitrophenol		471	ND	364	•	20.0-110	77.3			
N-Nitrosodi-n-propylamine		235	ND	189	u	23.0-116	80.4			
Pentachlorophenol	**	471	ND	331	n .	39.0-129	70.3			
Phenol		471	ND	350	н	31.0-115	74.3			
Pyrene		235	ND	209	"	63.0-113	88.9			
1.2.4-Trichlorobenzene	•	235	ND	177		54.0-123	75.3			
Surrogate 2-FP	"	118	1.10	69.4		40.0-115	58.8			
Surrogate: Phenol-d6	"	118		87.3	"	18.0-145	74.0			
Surrogate 2.4,6-TBP	"	118		96.9	"	24.0-130	82.1			
Surrogate. Nitrobenzene-d5	"	118		82.7	,,	42.0-110	70.1			
Surrogate: 2-FBP	n	118		101	,,	46.0-116	85.6			
Surrogate. p-Terphenyl-d14	"	118		101	,,	63.0-117	92.4			

9405 S W Nimbus Avenue, Beaverton, OR 97008-7132

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin





PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

9/1/98 to 9/2/98 Sampled:

600 University St., Suite 800

Project Number: 10022-03

Received: 9/3/98

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### Semivolatile Organic Compounds by EPA Method 8270C/Quality Control North Creek Analytical - Bothell

	Date	Spike	Sample	QC		Reporting Limit	Recov.	RPD	RPD	
Analyte	Analyzed	Level	Result	Result	Units	Recov. Limits	%	Limit	<u>%</u>	Notes*
Matrix Spike Dup	<u>0980182-M</u>	SD1 E	3809089-04							
Acenaphthene	9/14/98	235	ND	167	นย/ไ	48.0-110	71.1	31.0	10.1	
4-Chloro-3-methylphenol	ч	471	ND	338	**	45.0-110	71.8	30.0	8.41	
2-Chlorophenol	*	471	ND	265	10	39.0-110	56.3	38.0	19.4	
1.4-Dichlorobenzene	n	235	ND	152	11	27.0-110	64.7	42.0	19.5	
2.4-Dinitrotoluene	11	235	ND	182	**	60.0-110	77.4	28.0	15.7	
4-Nitrophenol	**	471	ND	341	"	20.0-110	72.4	33.0	6.55	
N-Nitrosodi-n-propylamine	11	235	ND	170	**	23.0-116	72.3	36.0	10.6	
Pentachlorophenol	n	471	ND	319	17	39.0-129	67.7	22.0	3.77	
Phenol	H	471	ND	286	· ·	31.0-115	60.7	38.0	20.1	
Pyrene	**	235	ND	201	11	63.0-113	85.5	18.0	3.90	
1.2.4-Trichlorobenzene	ч	235	ND	147	+r	54.0-123	62.6	29.0	18.4	
Surrogate: 2-FP	,,	118		62.8	"	40.0-115	53.2			
Surrogate: Phenol-d6	"	118		76.4	"	18.0-145	64.7			
urrogate: 2,4,6-TBP	"	118		97.6	"	24.0-130	82.7			
Surrogate: Nitrobenzene-d5	"	118		76.4	"	42.0-110	64.7			
Surrogate: 2-FBP	"	118		96.6	"	46.0-116	81.9			
Surrogate: p-Terphenyl-d14	"	118		111	"	63.0-117	94.1			

orth Creek Analytical - Bothell

\*Refer to end of report for text of notes and definitions.





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SPOKANE • (509) 924-9200 • FAX 924-9290 PORTLAND - (503) 906-9200 - FAX 906-921

Tetra Tech. Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number:

10022-03

9/3/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

9/28/98 17:46 Reported:

#### Conventional Chemistry Parameters by APHA/EPA Methods/Quality Control North Creek Analytical - Bothell

	Date Spike Samp	ole QC		Reporting Limit	Recov.	RPD	RPD
Analyte	Analyzed Level Res	ult Result	Units	Recov. Limits	%	Limit	% Notes*
Batch: 0980401	Date Prepared: 9/10/98		<u>Extra</u>	ction Method: Ger	neral Pre	paration	
<u>Blank</u>	0980401-BLK1						
Cyanide (total)	9/10/98	ND	mg/l	0.09500			
LCS	0980401-BS1						
Cyanide (total)	9/10/98 0.0500	0.0473	mg/l	62.0-136	94.6		
<u>Duplicate</u>	0980401-DUP1 B809006-	01					
Cyanide (total)		ND ND	mg/l			21.0	
	•						

North Creek Analytical - Bothell

\*Refer to end of report for text of notes and defin

Joy B Chang, Profect Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 East 11115 Montgomery, Suite B. Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue. Beaverton, OR 97008-7132



PORTLAND = (503) 906-9200 = FAX 906-9210

Tetra Tech, Inc.

Project: Bradford Island Landfill

Sampled: 9/1/98 to 9/2/98

600 University St., Suite 800

Project Number: 10022-03

9/3/98 Received:

Seattle, WA 98101

Project Manager: Carlotta Cellucci

Reported: 9/28/98 17:46

#### **Notes and Definitions**

#	Note
1	Suspected laboratory contaminant.
2	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
3	Background contamination found in the Method Blank. High spike recovery may be due to background contamination.
4	Analyses are not controlled on matrix spike RPD and/or percent recoveries when the sample concentration is significantly higher than the spike level.
5	The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
Recov.	Recovery
RPD	Relative Percent Difference

orth Creek Analytical - Bothell

Joy B Chang Proj

# TRA TECH, INC. 15400 NE 90th, Suite 100 Redmond, Washington 98052 (206) 883-1912 FAX (206) 881-6997

## **CHAIN OF CUSTODY**

ס	0	CI	U	М	ΕN	ΙT		

FAX (206) 881-699																						Po	80108	9	
PROJECT NAME  SAMPLERS: (signature)	1 I.sla	-d					Γ NO.			IERS		$\int$	/	$\overline{}$	7		7	$\overline{}$	7	$\overline{}$	/	7			
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# EMSL Analytical, Inc.

1001 SW Klickitat Way, Ste 107

Seattle, WA 98134

Phone: (206) 233-9007

Fax: (206) 233-901 EMS

Attn.: Carlotta Collucci

Tetra Tech, Inc.

600 University Street

Suite 800

Seattle, WA 98101

Wednesday, September 02, 1998

Ref Number: SE982526

### POLARIZED LIGHT MICROSCOPY (PLM)

Performed by EPA 600/R-93/116 Method®

Project: Bradford Island Landfill

SAMPLE	LOCATION	APPEARANCE	SAMPLE TREATMENT	<u>ASBESTOS</u> % TYPE	*	NONASE FIBROUS		NONFIBROUS
8-20-98-BIL- ASB-01		Black Fibrous Harnogeneous	Teased/Dissolved	45% Chrysotile	5%	Callulose	50%	Other
8-20-98-BIK- ASB-02 SILVER TOP COATING		Silver Non-Fibrous Layers # 2	Teased/Dissolved	None Detected	2%	Cellulose	98%	Paint/Coating
8-20-98-8IK- B-02 DOFING		Black Non-Fibrous Layers # 2	Teased/Dissolved	None Detected	5%	Celiulose	95%	Other
8-20-98-BIK- ASB-03 CAB		Grey/Black Non-Fibrous Hornogeneous	Tessed/Crushed	22% Chrysotile	3%	Сејіщозе	75%	Other

Comments: For all obviously heterogeneous samples easily separated into subsamples, and for layered samples, each component is analyzed separately. Also, "# of Layers" refers to number of separable subsemples.

NY samples also analyzed by ELAP 198-1 Method

Lisa Chen **Analyst** 

uaranteed. Samples reported as <1% or none detected should be tested with either SEM or TEM. The above test report relates only to the literated. This report may only be reproduced in part with written approval by EMSL. This above test must not be used by the client to claim product present by MVLAP nor any agency of the United States Government, All TVVLAP reports with NVLAP logo must contain at least one signature. endorsement by NVLAP nor any agency of the United States Go ed to physically esperate and analyze layered samples.

nalysis performed by EMSI, Seattle INVLAP Air and Bulk #200019



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## **APPENDIX I**

## DATA QUALITY EVALUATION REPORT

#### DATA QUALITY EVALUATION REPORT

Site Name:

U.S. Army Corps of Engineers - Former Bradford Island

Landfill, Cascade Locks, Oregon

Laboratory:

North Creek Analytical

Bothell, Washington

Contract Number:

DACW57-96-D-0009

Task Order Number:

10

Quality Control Criteria Reviewed:

Refer to Section 1.1

Report Date:

30 October 1998

#### 1.0 INTRODUCTION

This report summarizes the evaluation of 14 soil samples, including one field quality assurance (QA) sample, and four groundwater samples, including one field QA sample collected during the assessment of the former Bradford Island Landfill, Cascade Locks, Oregon, on behalf of the U.S. Army Corps of Engineers, Portland District (CENWP). Soil samples were collected from 17 through 20 August 1998. Groundwater samples were collected between 01 and 02 September 1998. The project soil and groundwater samples were submitted to North Creek Analytical in Bothell, Washington, for laboratory analysis. The laboratory assigned two work orders for this project, including Work Order No. B808411 for soil samples and Work Order No. B809089 for groundwater samples. A laboratory batch number was assigned to soil and groundwater samples based on specified laboratory analyses. Table 1 identifies project soil and groundwater samples, including associated laboratory sample designation, field QA identification, and associated laboratory analyses with cross-referenced QA batch identification.

Data were reviewed and validated according to the U.S. Environmental Protection Agency (EPA) guidance document *U. S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 1994). The analytical data review was conducted in accordance with the specifications set forth in the final site inspection Work Plan (Tetra Tech 1998).

#### 1.1 QUALITY CONTROL CRITERIA REVIEWED

The following quality control (QC) criteria were used for this data review and evaluation effort:

- Holding times
- Laboratory blank results
- Continuing calibrations
- Field blanks
- Field duplicate results

- Matrix spike/matrix spike duplicate results
- Laboratory duplicate and control sample results
- Surrogate recoveries
- Practical quantitation limits
- Overall assessment of data

#### 1.2 DATA QUALIFIERS

The following data qualifiers are used in this data evaluation report. The definitions are consistent with EPA guidance document for data evaluation (EPA 1994):

No qualifier

- Indicates that the data are acceptable both qualitatively and quantitatively

U

- Indicates compound was analyzed for but not detected above the concentration listed--the concentration listed is the sample quantitation limit. The laboratory uses "ND" instead

J - Indicates an estimated concentration--the result is considered qualitatively acceptable, but quantitatively unreliable

UJ - Indicates an estimated quantitation limit--the compound was analyzed for, but was considered non-detected

R - The data are unusable (compound may or may not be present)--resampling and reanalysis is required if verification is needed

#### 2.0 ANALYTICAL METHODS

Analytical methods and references for analyses are presented below and summarized on Table 1. The analysis of project samples collected during the former Bradford Island landfill site inspection was performed by North Creek Analytical of Bothell, Washington, a COE-validated laboratory that has

been approved by the U.S. Army Corps of Engineers - Missouri River Division. The chosen laboratory has performed analytical services for the U.S. EPA Contract Laboratory Program (CLP) and have established protocols and QA procedures that conform with EPA guidelines and Oregon State Department of Environmental Quality (DEQ) procedures. Routine analysis of solid and liquid environmental samples were performed using procedures based on the following EPA and State of Oregon methods:

- EPA Method 8260B volatile organic compounds by gas chromatography/mass spectrometry (GC/MS) (EPA 1996).
- EPA Method 8270C semi-volatile organic compounds by GC/MS (EPA 1996).
- EPA Method 8081A/8082 organochlorine pesticides and polychlorinated biphenyls (PCBs) by gas chromatography/electron capture detection (GC/ECD) (EPA 1996).
- EPA Method 8151A chlorinated herbicides by GC (EPA 1996)
- Northwest Total Petroleum Hydrocarbons: TPH Identification (NWTPH-HCID); Diesel Range Extended (NWTPH-Dx), and Gasoline Range (NWTPH-Gx) by gas chromatography/flame ionization detector (GC/FID) (DEQ 1996).
- EPA 6000 and 7000 series methods/metals by inductively coupled plasma and mass spectroscopy and mercury by cold vapor atomic absorption spectroscopy (EPA1996).
- EPA method 9010B Total and amenable cyanide by distillation (EPA 1996)
- EPA Method Synthetic Precipitation Leaching Procedure Metals Synthetic precipitate leaching procedure by Extraction Method 1312 and leachate analysis by appropriate EPA 6000 or 7000 series method (EPA 1996).

#### 3.0 EVALUATION RESULTS

The following sections summarize the data evaluation results for project soil and groundwater samples collected during the assessment of the former Bradford Island Landfill, Cascade Locks, Oregon. The QC criteria identified in Section 1.1 are evaluated independently for each sample media (i.e., soil and groundwater).

#### 3.1 SOILS (Work Order No. B808411)

Laboratory Work Order No. B808411 comprises 14 soil samples, including one field QA sample (refer to Table 1). The following section provides a summary of the QC criteria review for project soil samples.

#### 3.1.1 Holding Times

All analyses were performed within the applicable method-specified maximum holding times (EPA 1996), with the exception of sample 8-17-98-BIL-SB1-01 which was analyzed 15 days after sample collection for volatile organic compounds by Method EPA 8260B (i.e., EPA method-specified maximum holding time = 14 days). Positive results for this sample are qualified as estimated (J) values. Non-detected compounds are also qualified as estimated (UJ) values based on the exceeded sample holding time.

#### 3.1.2 Method Blanks

No target analytes were detected in associated laboratory method blank samples during the analyses of project soil samples, with the exception of the metal elements calcium and potassium in method blank sample 0980293-BLK1 at a concentration of 10.6 milligrams per kilogram (mg/kg) and 17.8 mg/kg, respectively. The concentrations of calcium and potassium detected in project soil samples is greater than 10 times the concentration detected in the associated method blank and therefore no qualification of the associated sample data is deemed necessary.

#### 3.1.3 Field Blanks

No field blank samples were collected or analyzed in association with project soil samples. No qualification of data is required.

#### 3.1.4 Continuing Calibration

Continuing calibrations for soil analyses were performed at the required frequencies and were within established acceptance criteria, with the following exceptions:

- Total Petroleum Hydrocarbons-- The continuing calibration for diesel and lube oil range hydrocarbons in samples 8-19-98-BIL-TP1-SS-01, 8-19-98-BIL-TP2-SS-01, 8-20-98-BIL-TP6-SS-01, 8-20-98-BIL-TP9-SS-01, and associated blank sample 0880788-BK1 were performed slightly outside the required 12 hour calibration frequency (i.e., continuing calibration exceeded specified 12 frequency by approximately 45 minutes) due to an instrument stoppage. The continuing calibrations were within all other acceptance criteria and no qualification of the associated sample data is deemed necessary based on this review.
- Organochlorine Pesticides and PCBs-- The continuing calibrations for the analysis of organochlorine pesticides and PCBs in soil (i.e., QA Batch No. 0880705) were outside established acceptance criteria for two compounds, including 4,4'-DDT and Methoxychlor. The responses for these compounds were below the lower calibration control limit indicating that positive results may exhibit a low bias. Two samples revealing detected concentrations of 4,4'-DDT, including samples 8-17-BIL-PW1-SB1-SS-01 and 8-19-98-BIL-TP1-SS-01 were reanalyzed (i.e., within method-specified holding time). Beginning calibrations were within acceptance criteria; however, the continuing calibration was again below the established control limits for these compounds and is the suspected results of matrix effects. The detection of 4,4'-DDT in samples 8-17-BIL-PW1-SB1-SS-01 and 8-19-98-BIL-TP1-SS-01 are qualified as estimated (J) values. All non-detected compounds are also qualified as estimated (UJ) values based on the potential for low bias.

Semi-Volatile Compounds— The continuing calibrations for the analysis of semi-volatile compounds in soil (i.e., QA Batch No. 0880681) were within established acceptance criteria. However, several compounds in samples 8-20-98-BIL-TP5-SS-01 and 8-20-98-BIL-TP9-SS-01 (i.e., associated blind field duplicate) were flagged by the laboratory as estimated values due to matrix interference with the internal standard associated with the specified analytes. No additional qualification of the associated sample data is deemed necessary based on this review.

#### 3.1.5 Matrix Spike/Matrix Spike Duplicate Results

The matrix spike/matrix spike duplicate (MS/MSD) results for project soil samples were found to be within the laboratory-specified percent recovery and relative percent difference (RPD) control limits, with the exception of the following:

- Volatile Organic Compounds— The percent recovery for 1,1-Dichloroethene was 67.8 percent was slightly below the associated lower matrix spike recovery control limit of 70 percent for QA Batch 0880906. The laboratory indicated that 1,1-Dichlorothene was diminished in the analytical spiking standard due to volatilization and that the recovery for this analyte does not represent an out-of-control condition for the sample batch. Based on review of associated batch QC results no qualification of the associated sample data is deemed necessary.
- Total Metals-- Matrix spike recoveries were outside associated control limits for manganese (no recovery), antimony (low recovery), lead (low recovery), and zinc (high recovery) in QA Batch 098038. Matrix effects in spike sample 8-19-98-BIL-TP4-SS-01 are attributed to the relatively poor recovery of these compounds. No qualification of the associated sample data is deemed necessary based on review of these matrix spike recovery results.

No MS/MSD sample recovery was reported for aluminum, calcium, iron, magnesium, or sodium in QA Batch 0980557 due to the high concentrations of these metals in the spiked sample (i.e., sample 8-19-98-BIL-TP4-SS-01). No qualification to the associated sample data is deemed necessary based on this result.

No MS/MSD sample recovery was reported for mercury in QA Batch 0980054 due to the concentration of this metal in the spiked sample 8-20-98-BIL-TP8-SS-01. No qualification to the associated sample data is deemed necessary based on this result.

■ SPLP Leachate— The MS/MSD percent recovery for magnesium and MSD percent recovery for sodium were above the established control limits for QA Batch 098291. These results are attributed to matrix interference and sample concentrations which are higher than the spike level. No qualification of the associated sample data is deemed necessary based on these results.

#### 3.1.6 Laboratory Duplicate and Control Sample Results

Laboratory duplicate results were within specified RPD limits and laboratory control sample (LCS) results were within laboratory-specified percent recovery limits for all soil analyses, with the exception of the following:

laboratory acceptance criteria for arsenic, barium, chromium, manganese, lead, vanadium, and zinc. The laboratory-specified RPD limits (i.e., ± 20 percent) for these metals were reportedly exceeded due to the nonhomogeneous nature of sample 8-19-98-BIL-TP4-SS-01. Accounting for the variability in the sample matrix a less restrictive RPD control limit of ± 40 percent has been applied for review purposes, as specified in the project Work Plan (Tetra Tech 1998). A single metal, arsenic, at 58.4 percent is observed outside the ± 40 percent control limit and associated sample results for arsenic are qualified as estimated (J) values.

The metal sodium was found slightly above the associated LCS percent recovery upper control limit for QA Batch 0980293 which indicates that positive results may exhibit a high bias for this element. Based on this result all positive detections of sodium in the associated soil samples are qualified as estimated (J) values.

#### 3.1.7 Field Duplicate Results

One blind field duplicated soil sample, designated as 18-20-98-BIL-TP9-SS-01 to avoid detection by the laboratory, was collected concurrently with project soil sample 18-20-98-BIL-TP5-SS-01. The duplicate field sample was submitted for the same set of analyses conducted on the associated project sample. Table 2 provides a summary of the field duplicate sample results and associated RPDs by analytical method. No semi-volatile compounds, organochlorine pesticides and PCBs, or chlorinated herbicide compounds were detected in either the project soil sample or associated field duplicate sample (refer to Figure 2). No RPDs were calculated for compounds that were detected below five times the associated laboratory reporting limit. The RPD values calculated for VOCs included toluene at 19.4 percent and 1,2,4-trimethylbenzene at 106 percent. The RPDs calculated for total petroleum hydrocarbons ranged from 11.7 percent for diesel range hydrocarbons and 43.4 percent for lube oil range hydrocarbons. The RPDs for metals in soil ranged from 3.5 percent for magnesium to 71.8 percent for mercury, with an average RPD of 21.8 percent for all metals. No qualification of the associated sample data was deemed necessary based on review of the field duplicate results.

#### 3.1.8 System Monitoring Compounds (Surrogate Recoveries)

The surrogate recoveries associated with the organic analyses conducted on project soil samples were within method-specified control limits, with the exception of the following:

- Volatile Organic Compounds-- Two surrogate compounds, 2-bromopropene and 4-BFB are observed slightly below the established control limit in sample 8-19-98-BIL-TP1-SS-01. No VOC compounds were detected at or above the laboratory reporting limit. However, the non-detected results for sample 8-19-98-BIL-TP1-SS-01 are qualified as estimated (UJ) values base on the low surrogate recoveries which may result in a low bias result for this sample.
- Semi-volatile Compounds—One of six surrogate spike compounds, including phenol-d6 was detected below the established control limit in sample 8-20-98-BIL-TP6-SS-01. No qualification of the associated sample data is required based on this review.

Two acid fraction surrogate compounds, including 2-FP and phenol-d6 were detected below the established control limit in sample 8-20-98-BIL-TP7-SS-01. Both surrogates were detected at less than 10 percent recovery, which could indicate a low bias result for this sample. Although the loss of acid fraction surrogates is the suspected result of sample dilution, all acid fraction compounds positively detected for this sample are qualified as estimated (J) values. All non-detected acid fraction compounds are also qualified as estimates (UJ) based specifically on the very low acid fraction surrogate recoveries in this sample.

Organochlorine pesticides and PCBs-- The upper control limit of surrogate spike compound TCX was slightly exceeded in sample 8-19-98-BIL-TP4-SS-01. No qualification of the associated sample data is required based on this review.

The surrogate compound TCX was not recovered in four project soil samples, samples 8-20-89-BIL-TP5-SS-01, 8-20-89-BIL-TP6-SS-01, 8-20-89-BIL-TP7-SS-01, and 8-20-89-BIL-TP9-SS-01. The practical quantitation limit for these samples were reportedly raised based on sample dilution to account for matrix interference. Both positive and non-detected results for these samples are qualified as estimated (i.e., J and UJ, respectively) values based on the loss of the surrogate spike and the potential for low ½ biased results in these samples.

Herbicides-- The surrogate recovery control limits for project soil samples were met. However, the reporting limits for two compounds, including dinoseb and dalapon were raised in all samples due to sample cleanup and dilution. The reporting limit for dinoseb was reportedly raised to account for matrix interference and for dalapon due to interfering extraction background peaks. No qualification of associated sample data is required based on this review.

#### 3.1.9 Practical Quantitation Limits

The practical quantitation limits, as specified in the project work plan for soil sample analyses (Tetra Tech 1998), were adhered to by the laboratory with the exception of several samples associated with semi-volatile organic compounds and organochlorine pesticides and PCBs analyses. For these analyses,

sample-specific dilutions were performed as necessary to address observed matrix effects and/or high analyte concentrations. No additional qualification of the associated sample data is deemed necessary based on this review.

#### 3.1.10 Overall Assessment of Soil Data

Overall, the analytical results in Work Order B808411 meet the data quality objectives set forth in the project Work Plan (Tetra Tech 1998). The laboratory's performance was generally considered good. The non-homogeneous nature of the sample matrix and elevated concentrations of various organic compounds and inorganic elements detected in project soil samples contributed significantly to the variability observed in the QC criteria described above.

#### 3.2 GROUNDWATER (Work Order No. B809089)

Laboratory Work Order No. B809089 comprises 4 groundwater samples, including one field QA sample (refer to Table 1). The following section provides a summary of the QC criteria review for project groundwater samples.

#### 3.2.1 Holding Times

All analyses were performed within the applicable method-specified maximum holding times (EPA 1996). No qualification of associated sample data are required based on this review.

#### 3.2.2 Method Blanks

No target analytes were detected in associated laboratory method blank samples during the analyses of project groundwater samples, with the exception of the following:

• Volatile Organic Compounds-- Methylene chloride was detected in blank sample 0980188-BLK1 at a concentration of 5.07 micrograms per liter (μg/L). Methylene chloride is a common laboratory artifact and was detected in one of four groundwater samples submitted for VOC analysis, sample 090298-BIL-MW2-GW-01, at a

concentration of 5.24  $\mu$ g/L. This sample result, as reported by the laboratory, should be qualified by elevating the quantitation limit to the concentration found in the sample and reported as non-detect.

Total Metals-- Calcium was detected in laboratory method blank sample 0980557-BLK1 at a concentration of 0.44 micrograms per liter (μg/L). The concentration of calcium detected in project soil samples is greater than 10 times the concentration detected in the associated method blank and therefore no qualification of associated sample data is deemed necessary.

#### 3.2.3 Field Blanks

One trip blank sample, designated by the laboratory as B809089-05, was submitted with project groundwater samples for VOCs analysis. Two VOC compounds were detected in the trip blank sample at relatively low concentration, including methylene chloride at a concentration of 7.91  $\mu$ g/L and carbon disulfide at a concentration of 2.29  $\mu$ g/L. Methylene chloride was detected in an associated method blank sample and is considered a common laboratory artifact. Carbon disulfide was not detected in project groundwater samples. No qualification of the associated sample data is deemed necessary based this review.

#### 3.2.4 Continuing Calibration

Continuing calibrations were performed at the required frequencies and compared to the correct initial calibration with the following exceptions:

groundwater samples (i.e., QA Batch No. 0980213) were outside of the established acceptance criteria for 4,4'-DDT, heptachlor, endrin, endosulfan sulfate, 4,4'-DDD, and methoxychlor. These responses were above the upper control limit resulting in a potential high bias for positive sample results. The initial groundwater sample results were non-detect for all compounds. The laboratory reanalyzed the groundwater samples (i.e., within method-specified holding times) on 14 October 1998 with results matching the previous analysis. No organochlorine pesticide or PCB compounds were

detected in project groundwater samples, and no qualification of the associated sample data is deemed necessary based on this review.

#### 3.2.5 Matrix Spike/Matrix Spike Duplicate Results

The MS/MSD results for project groundwater samples were found to be within the laboratory-specified percent recovery and RPD control limits, with the exception of the following:

- Volatile Organic Compounds— The percent recovery for 1,1-Dichloroethene and benzene is identified below the associated lower matrix spike recovery control limit for QA Batch 0980188. The laboratory indicated that 1,1-Dichlorothene and benzene were diminished in the analytical spiking standard due to volatilization, and that the recovery for these analytes does not represent an out-of-control condition for the sample batch. Based on review of associated batch QC results no qualification of the associated sample data is deemed necessary.
- Total Metals-- MS/MSD percent recoveries and RPDs were outside established control limits for calcium and iron in QA Batch 0980557 due to the high concentrations of these metals in the spiked sample 090298-BIL-MW5-GW-01. No qualification of the associated sample data is deemed necessary based on this review.
- Organochlorine Pesticides and PCBs-- MS/MSD percent recoveries and RPDs were slightly outside established control limits for aldrin and heptachlor in QA Batch 0980180. No associated compounds were detected in project groundwater samples and no qualification of the associated sample data is deemed necessary based on this review.

#### 3.2.6 Laboratory Duplicate and Control Sample Results

Laboratory duplicate results were within specified RPD control limits and LCS results were within laboratory-specified percent recovery limits for all groundwater sample analyses, with the exception of the following:

Total Metals— The metal calcium was recovered slightly above the associated LCS percent recovery upper control limit for QA Batch 0980557 because of suspected laboratory contamination. Based on the LCS upper control limit exceedance and the potential for a high bias result, all positive detection of calcium in associated groundwater samples are qualified as estimated (J) values.

#### 3.2.7 Field Duplicate Results

One blind field duplicated groundwater sample, designated as 090198-BIL-MW5-GW-01 to avoid detection by the laboratory, was collected concurrently with project groundwater sample 090198-BIL-MW4-GW-01. The duplicate field sample was submitted for the same set of analyses conducted on the associated project sample. Table 3 provides a summary of the groundwater field duplicate sample results and associated RPDs by analytical method. No semi-volatile compounds, organochlorine pesticides and PCBs, chlorinated herbicide compounds, or cyanide were detected in either the project groundwater sample or associated field duplicate sample (refer to Figure 3). A single VOC compound, including toluene at relatively low concentration of  $1.11~\mu g/L$  was detected in sample 090198-BIL-MW4-GW-01 but was not detected in the associated duplicate sample. The single detection of toluene was noted by the laboratory as a potential laboratory artifact. The RPD calculated for diesel range hydrocarbons was 2.4 percent. The RPDs for metals in groundwater ranged from 0.4 percent for calcium and zinc to 21.3 percent for iron, with an average RPD of 6.1 percent for all metals. No qualification of the associated sample data was deemed necessary based on review of the field duplicate results.

#### 3.2.8 System Monitoring Compounds (Surrogate Recoveries)

The surrogate recoveries associated with the organic analyses conducted on project groundwater samples were within method-specified control limits. No qualification of the associated sample data is required.

#### 3.2.9 Practical Quantitation Limits

The method-specific practical quantitation limits reported by the laboratory for all groundwater analyses are consistent with those specified in the project Work Plan (Tetra Tech 1998).

#### 3.2.10 Overall Assessment of Groundwater Data

Overall, the analytical results in Work Order B809089 meet the data quality objectives set forth in the project Work Plan (Tetra Tech 1998) with good laboratory performance.

#### 4.0 REFERENCES

EPA 1996. Test Methods for Evaluating Solid Waste. Office of Solid Waste and Emergency Response. SW-846. Third edition and updates. December, 1996.

Tetra Tech 1998. Final Work Plan, Bradford Island Landfill Site Inspection, Cascade Locks, Oregon. Prepared for the U.S. Army Corps of Engineers, Portland District. Contract No.: DACW57-96-D-0009. Task Order No.: 10. January 1998.

U.S. Environmental Protection Agency (EPA) 1994. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Office of Solid Waste and Emergency Response. Document number EPA-540/R-94-013. February 1994.

## APPENDIX J

## LANDFILL VOLUME ESTIMATES

# FORMER BRADFORD ISLAND LANDFILL VOLUME ESTIMATE

The following estimates of the lateral extent and volume of materials present within the Bradford Island landfill are based on the areas depicted on Figures J1 and J2.

#### **Estimate of Lateral Extent**

```
50 ft X 50 ft = 2,500 ft<sup>2</sup>

25 ft X 75 ft = 1,875 ft<sup>2</sup>

75 ft X 100 ft = 7,500 ft<sup>2</sup>

75 ft X 125 ft = 9,375 ft<sup>2</sup>
```

= 
$$21,250 \text{ ft}^2$$
  
X  $2.296 \text{ X } 10^{-5} \text{ acres/ ft}^2$ 

= 0.4879 acres

#### Volume Estimate

25 ft X 50 ft X 8 ft =  $10,000 \text{ ft}^3$ 25 ft X 75 ft X 14 ft =  $26,250 \text{ ft}^3$ 50 ft X 100 ft X 16 ft =  $80,000 \text{ ft}^3$ 25 ft X 125 ft X 12 ft =  $37,500 \text{ ft}^3$ 25 ft X 125 ft X 10 ft =  $31,250 \text{ ft}^3$ 25 ft X 100 ft X 8 ft =  $25,000 \text{ ft}^3$ 25 ft X 50 ft X 6 ft =  $7,500 \text{ ft}^3$ 

$$\frac{237,500 \text{ ft}^3}{27 \text{ ft}^3/\text{yd}^3}$$

= 8796.30 yd<sup>3</sup>

